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# AMERICAN JOURNAL OF OPHTHALMOLOGY

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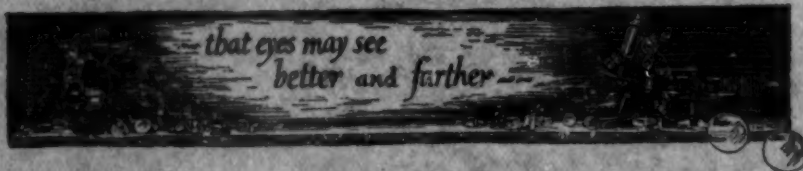
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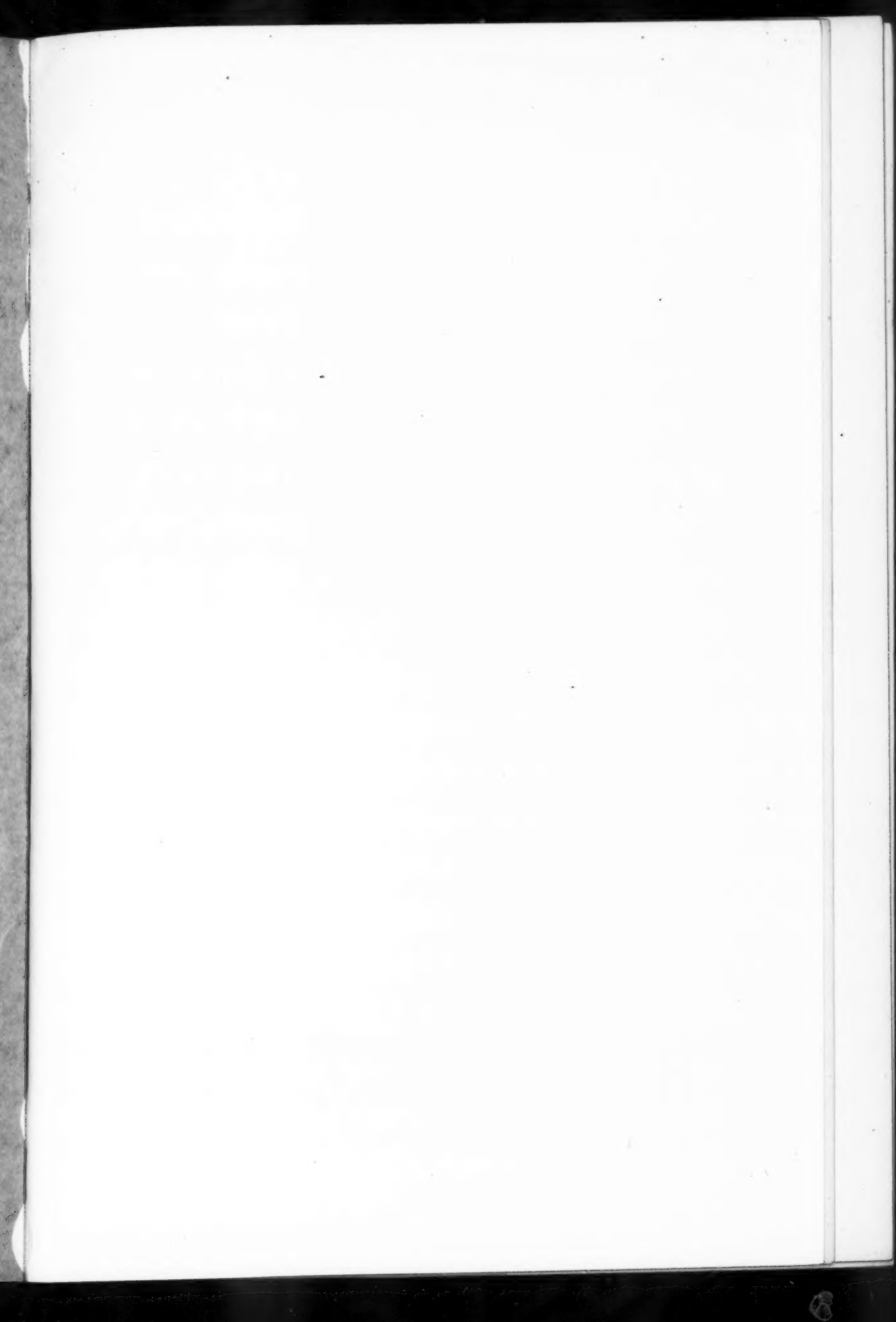
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LEFT EYE

SYMMETRICAL MACULAR DEGENERATION. (CHANCE)

RIGHT EYE



# AMERICAN JOURNAL OF OPHTHALMOLOGY

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## SYMMETRIC MACULAR DEGENERATION IN A BROTHER AND SISTER.

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The degenerative changes revealed by ophthalmoscopy in these patients are accompanied by low visual acuity, defective color vision and some contraction of the visual fields. The eyes also presented rather high astigmatism. A maternal aunt presented a different anomaly of the central retina. Reported at the Meeting of the Section on Ophthalmology, College of Physicians, January 15, 1920. With two water color drawings.

In order that they might be included among the already reported cases of symmetric disease of the macula, found in two or more members of a family, I desire to give a brief account of the findings occurring in the case of a man and his younger sister.

Harry D., aged 28. Ophthalmoscopic examinations:

Right: Clear Media. Disc nearly circular, the edge of which is well preserved, but the pigment line along the temporal border is broken and slightly absorbed. The surface of the disc shows few, if any, capillaries, and the arteries and veins might be considered too narrow for one of his years and physique. Thruout the fundus the retinal epithelium is slightly absorbed, and the membrane "peppered"; and that portion of the fundus embraced by the temporal vessels is quite black with pigment.

The macular region presents a well marked disk-shaped area of distinct absorption of the retinal tissue. It is bordered by fine soft pigment which is heaped up on the inner and the outer borders; while at the upper and the lower, the pigment is scattered, and, at these portions the choroid beneath shines thru like flames. The chorio-capillaris is exposed, and across the lower chord runs a branch of the mid-temporal artery. The upper portion of the rim seems to have fine fibrils stretched across it. There are no signs of active inflammation within the area,

and there are no outlying areas of disease. The dimension of the area is greater than that of the optic disc, the upper edge of the spot being on a line with the upper edge of the nerve head.

Left: Thru the unobstructed media the fundus is seen to possess practically the same features as those given in the description of the right eye. The disc is sharply outlined by its preserved borders. The central vessels show a greater branching, and the individual trunks are somewhat narrower in caliber than was noted for the right eye. The region embraced by the temporal vessels is dark, yet it is not so densely pigmented as that in the right.

The macular region is occupied by the same sort of anomaly as that present in the right eye. This area is larger than the optic disc. Its border is quite complete and is slightly elevated above the retinal level. The choroid is shown as a rough surface with here and there capillary loops shining thru it. In general, the chorioidal level is deeper than is the level in the spot in the right; so that the formation here is somewhat crater like. No vessels extend across, but a branch of a vein skirts the lower edge, and there are three clumps of pigment on the surface, one of which is connected with the rim. As in the right, the rest of the fundus is healthy. I fancy that the degenerative changes of this eye are of a later date in their origin than are those of the right.

Agnes D., aged 24. Ophthalmoscopic examinations.

Right: Beneath the lens capsule, at the temporal side of the anterior pole, is a small dot like opacity. The disc is vertically oval and is without a physiologic cup. The upper border is veiled by opaque fibers; and on the temporal side, beyond a pronounced pigment line, is a distinct conus, to the outer side of which is a dark streak of pigment. The main vessels are much narrower than what one usually finds in persons of this woman's age. The papillomacular region is darkly pigmented.

The macular region itself is occupied by an irregularly round atrophic area, without elevated border, the surface seeming to be depressed below the level of the retina as tho the tissues had become absorbed. Stretching across the area from the upper temporal quadrant to the lower is a reddish streak, which is touched at its middle by a blackish streak from the upper nasal quadrant. The long diameter of the area is about one-half the width of the nerve head. In general the characteristics are like those of the areas in the brother's eyes. The area has not such an appearance as tho it had been produced by recent inflammation, neither are there any signs of inflammation nor of atrophy elsewhere in the fundus. The eye is myopic 3 D.

Left: In the lower nasal quadrant of the cornea is a maculation, which followed a remembered attack of inflammation; and, as in the right, there is an opacity in the lens. The disc is vertically oval with a narrow cup in the center, out of which extend the vessels which are of about the width of those of the right, and the courses of the superior vessels are outlined by opaque fibers. The temporal border of the disc is paralleled by an ill defined conus. The nasal fundus is quite granular and the papillomacular region is darkly colored by scattered pigment, while the macula itself is blotted out by an area of nearly the same size, but not quite so deep as the depth appears to be in the spot of the right eye. The eye is myopic 3 D.

The man came to Wills Hospital in May, 1916. Thru the great kindness of Dr. Schwenk—I was then his assistant—I was allowed to study his case. The young woman was brought to me later, privately. Examinations were made repeatedly in that year; before the time set for a review arrived, I was on active duty in the army. The man was examined again only recently.

The sketches, made by Miss Washington, after repeated sittings, are remarkably true in details and colors. For some reason or other, she asked me to excuse her from sketching the woman's eye grounds, but offered, instead, the view that, to her eye, the characteristics of the woman's case might satisfactorily be indicated by the sketches of the man's taken together with my descriptions written at the time of the examinations.

The subjects are the children of Irish-American parents who were not consanguineous. They are the fourth and fifth children in a family of seven, five boys and two girls. The eldest, a brother, has one poor eye; his symptoms are not like those of H. and A. One of the brothers is dead: his death was not unusual, but the exact details were not obtained.

H. and his sister had had fair school education which they pursued up to about fourteen years of age. They had no unusual disease altho H. had pneumonia in his early years. From about their tenth or twelfth years each had defective sight. In 1903, Agnes consulted Dr. Fisher, at Wills Hospital, when she was ordered minus cylinders of 3 D. The notes state: "V. both eyes 5/35. pulsing veins; Vessels slightly attenuated. Spots at maculas."

The man has a slight dread of light, or rather, he is a bit dazed and peers about as tho somewhat dayblind. He has a convergent squint of the first degree, without nystagmus. But the young woman has a distinct horizontal nystagmus when she forcibly directs her attention. She is not dayblind.

Each has defective color vision of which each is aware. The woman wore a pink and white striped dress, the stripes one inch wide. To match the

pink she selected a blue skein. Green skeins she called "white"; for which she selected grays and blues. The rose skein she called "pink," and selected one blue and two reds. The man mis-called green, "pink," and selected a drab, one green, two roses, and a blue. A cobalt light appeared to him to be composed of red and light green. To him the rainbow had never been otherwise than as a whitish path in the sky.

The fields of vision were equally interesting. That for the man's right eye showed a regular contraction: N. 40; S. 40; T. 60; I. 40; for white, but when colors were used on the carrier, he could not name the colors altho he could distinguish the spots. The maps of such fields showed in comparison with white concentric contractions, without crossings. In the upper nasal quadrant from diameters  $25^{\circ}$  to  $45^{\circ}$ , was a well marked oval scotoma,  $20^{\circ}$  to  $40^{\circ}$ . The left chart showed practically the same amplitude without scotomata. He called 20 mm. green, "blue."

The woman's chart registered the following:

Right: Using white, 10 mm. square, marked regular contraction: N. 35; S. 35; T. 40; I. 35; without cuts or scotomata. Marked color defects were manifested: red and green were perceived but only as being different from white; yellow as "white"; blue uncertainly as "blue," green as "blue" and red undifferentiated from the black of the carrier.

A study of their refractions show that the man's visual acuteness equalled, in the right,  $2/60$ , corrected by  $+2.50$  S.  $\ominus +2.00$  c. ax.  $180^{\circ}=5/50$ . L= $2/60$ , with  $+2.50$  S.  $\ominus +2.00$  c. ax.  $15^{\circ}=5/50$ ; but later, when using his spectacles with both eyes open he was able to read  $5/25$ , and type 0.75.

The woman's record was as follows: each eye  $5/50$ , R= $3.00$  c. ax.  $180^{\circ}=5/50$ . L= $1.00$  S.  $\ominus -1.87$  c. ax.  $180^{\circ}=5/50$ , with both eyes open,  $5/35$ . The brightness of her sight was greatly increased by pin holes.

I regret that I have not yet had an opportunity to examine other members

of this family, yet, I had the chance to use the ophthalmoscope on a maternal aunt, of perfect health, with "strong eyes" which had never been diseased. She presented in her right eye an interesting fundus picture. In the region between the disc and the macula appeared a bright glistening area, map-like, or a two-peaked iceberg, on a level with the lower third of the disc, above which was another irregular area of almost the same general length; but extending beyond the outer border of the lower, and, midway between these two areas, a small island over the outer "peak." These curious anomalies were in the retina. There were no signs of disease or other anomaly. The left eye was healthy in all respects.

These cases undoubtedly are manifestations of degeneration of the retina, the cause of which I cannot explain. I do not believe they are congenital in origin, but became manifest in late childhood; and are, I fear, slowly progressive; altho there were no distinct departures from the depictions in the sketches when the man was examined late in October, 1919. I believe syphilis and tuberculosis can be excluded. Except for the symmetric areas the funduses are comparatively of such healthy appearance that one would not suspect so great a disease in the macular regions. Just why a pathologic agent should have selected the macular region for its action is inexplicable. I do not regard as valueless, in the complexity and the mystery of the case, the presence of the increased pigmentation of the retina; but believe that it is significant of a diffuse retinal degeneration.

I have not read every report of cases exhibiting bilateral macular degeneration; but from such research as I have made I regard my cases as unique in respect to the sizes of the degenerated areas, their sharp delimitation, their color and the comparative freedom from pigmentation on their surfaces, as well as the similarity of the characteristics of the two cases.

## RADIUM IN THE TREATMENT OF DISEASES OF THE EYE AND ADNEXA.

G. B. NEW, M.D., and W. L. BENEDICT, M.D.,

ROCHESTER, MINN.

This paper is based upon cases treated in the sections on Laryngology, Oral and Plastic Surgery and Ophthalmology in the Mayo Clinic. It includes a discussion of conditions likely to be benefited by radium with reports of illustrative cases.

The use of radium in the treatment of diseases of the eye and adnexa is becoming more common with the greater availability of the element. Radium has been employed in corneal ulcer, and in inflammatory diseases of the lids and globe, but has been found to be most useful in the treatment of malignant diseases and vascular tumors. Lawson, Ryerson, Williams, and others have reported cases which clearly demonstrate the value of radium in such conditions while Cohen has found it of some use in retarding the development of certain types of cataract.

Vernal catarrh is probably benefited by radium treatment; Pusey and Butler have reported cases in which the treatment was very satisfactory. We have treated 9 cases of vernal catarrh, but are withholding the report of results until we have made a further study of the cases.

It has been recommended that glioma and melanosarcoma shall be treated with radium (Heckel). Its use in glioma, however, is believed to be unwarranted by Horsley and Finzi, who say, "Radium rays from which the less penetrating beta rays have been filtered off . . . exert no influence, discoverable by present methods, in the nerve tissues." The radium has no effect on melanotic tumors comparable with its effect on basal-cell epitheliomas or vascular tumors and should be used only after wide removal of the pigmented mass.

Our own experience with the use of radium in diseases of the eye has been in two groups of cases, first those cases which in our judgment should be treated with radium alone; and second those in which the radium treatment is employed in addition to surgery. The malignant cases are selected on a

basis of the character of growth, chronicity, and extent of involvement of the tissues. Various types of epithelioma may be found about the lids and globe as well as within the eye. They may be situated on the margins of the lid, at the canthus, or at the limbus. The degree of malignancy will be determined by the type of cell most abundant, and by the location and direction in which the tumor extends. A basal-cell epithelioma may extend over considerable area on the surface of the lids and do less permanent damage than a much smaller, similar epithelioma at the inner canthus, which is rapidly extending toward the apex of the orbit.

Epitheliomatous nests that lie deep in the tissues are difficult to reach, and for several months, or even years, after treatment with radium, it is often impossible to determine whether or not the growth has become inactive. A section of tissues which had been subjected to treatment with radium years before, for epithelioma, was found to be undergoing epithelial cell proliferation and infiltration, without evidence on the surface. In some cases, therefore, it is better to remove the involved tissue with the knife or cautery and apply radium later. In other cases radium alone may be sufficient to effect a cure.

The action of radium in infectious diseases of the eye is comparatively slow. Rapidly extending ulcers of the cornea should be treated locally by the remedies commonly employed in addition to the use of radium, if it is used.

### APPLICATION OF RADIUM.

In diseases of the eye and adnexa radium is applied directly in contact with the growth in the form of a plaque, or as emanations.



In treating tumors it is best to insert the emanation or the radium directly into the center of the tumor. In treating superficial lesions the use of the plaque or the radium tube directly against the skin is the preferable method. We have not used any screening in these cases, except the rubber finger cot that encloses the radium tube or plaque. It is desirable that the cornea shall be protected in treating lesions of the lid in order to prevent severe reaction, but we have not seen any serious effects on the cornea from the use of radium. For this we have used a screen of lead 2 mm. thick.

In treating lesions of the cornea the eye is cocainized, a self-retaining retractor inserted, the radium placed in a lead applicator, and an area of the radium is exposed the size of the lesion to be treated. A nurse holds the applicator in position directly in contact with the lesion for as long as it can be borne comfortably by the patient, usually from fifteen minutes to one-half hour. It is essential in treating lesions around the eye that all radium applications shall be given within ten days so that the treatment will be completed before the radium reaction begins from ten days to two weeks afterward, lasting from two weeks to one month. The patient is advised to leave the area during this time open to the air as much as possible and to cleanse it with boracic solutions.

#### TYPES OF CASES TREATED.

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Vernal catarrh .....	9
Basal-cell epithelioma of lids and canthus .....	97
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#### ANGIOMA OF THE LIDS.

Radium is specific for angioma, lymphangioma, and hemangioma. The best results are obtained in young children, and in this group the angioma may be removed with but little if any deformity.<sup>6</sup> In treating the cavernous

type, the radium is used in the form of a very small tube which is inserted into the center of the tumor, thru a small incision in the normal skin close to it. A small pointed forceps is used to burrow into the tumor, in the same manner that a blister is opened. The radium tube, attached to a silk thread, is inserted thru this channel and left in place several hours, depending on the number of milligrams used and the size of the tumor. The results in this group of cases have been especially satisfactory; most of the tumors disappear in three or four months with one treatment. Superficial angiomas are treated by means of a 5 mg. plaque, kept moving over the entire area, thus distributing the treatment evenly.

#### BLASTOMYCOSIS.

Blastomycosis is treated by holding the radium tube or plaque directly over the lesion. The tissues about the lesion should be screened with lead 2 mm. thick, in order to protect them from the rays. The patient should be seen about every six weeks, so that if the first treatment is not sufficient to clear up the lesion it may be treated before the condition has a chance to become more extensive.

#### BASAL-CELL EPITHELIOMA.

Basal-cell epithelioma of the lids without involvement of the tarsus or bone may be entirely removed by radium treatment. The type of epithelioma and its location should be carefully considered before radium is recommended for lesions around the eyes. If the lesion appears to be active and extending rapidly, in all probability it is squamous-cell epithelioma which has developed on basal-cell epithelioma, and does not respond to radium so well as the basal-cell type, and therefore should be removed by excision with the knife, or knife and cautery, and the open wound treated with radium. If the bone is involved and there is a reasonable chance of eradicating the trouble the growth, and the eye if necessary, should be removed, the bone thoroly cauterized with soldering irons, and radium used in the open wound.



Temporizing in the treatment of epithelioma, especially epithelioma around the inner canthus, is frequently the cause of failure to cure. Radium eradicates the growth in a very large percentage of cases of basal-cell epith-

eral anesthesia should be employed and the excision made very wide of the growth. If a local anesthesia is used there is always a possibility of traumatizing some of the cells of the tumor. A plastic operation should not be done



Fig. 1. Sarcoma of Orbit, Feb. 25, 1918, before treatment with radium.

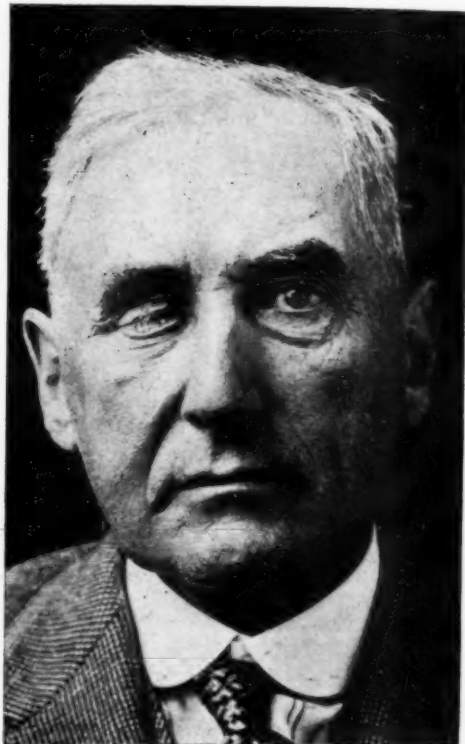


Fig. 2. Same as Fig. 1, April 17, 1918, after treatment.

elioma involving the lids, but not the tarsus or bone. The patient should return for observation about every six weeks for several months, so that if the trouble is not entirely eradicated by the first treatment, further treatment may be given. However, a large dose of the radium should be given at the first treatment since frequently the lesion treated with small doses is only aggravated, and the possibility of clearing up the trouble is diminished.

Melanotic tumor should not be treated with radium, but a radical operation to remove the growth should be done, since this is the only means of eradicating the malignancy. A gen-

on the lids for at least six months after the removal of the growth, because it tends to cover up the area in which the recurrence may take place.

#### SARCOMA OF THE ORBIT.

Sarcoma of the orbit is best treated by inserting the radium in the form of a tube directly into the tumor. It is well also to ray the parotid and submaxillary glands as a prophylactic measure. In our cases of young children the sarcoma has been reduced in size or entirely eradicated, but on account of marked malignancy the patients generally die because of metastasis. By the removal of the primary

tumor, however, we believe the child's life is increased by months and sometimes by years. In adults, the prognosis is much better; we have been very much encouraged by the use of radium in these cases; but we are not

removed. Fat was taken from the abdomen and transplanted into the orbit. Over this a shell eye was fitted and worn without difficulty until one month before his examination in the clinic.

On examination a mass was found



Fig. 3. Epithelioma of the cornea, May 11, 1918, before treatment with radium.



Fig. 4. Same as Fig. 3, July 7, 1918, after treatment.

able to state what the ultimate results will be.

CASE 214143. A man, aged 61, who was examined Nov. 16, 1917, had noticed diminution of vision in the right eye for eight years. He consulted an oculist, who told him that he had a detached retina. Two years later the vision in the eye was completely gone, and the intraocular tension was high. In another two years, because of frequent attacks of pain, the eyeball was

in the anterior part of the right orbit, under the lids. The palpebral fissure was open about one-quarter of an inch. The mass was covered by thickened hypertrophic conjunctiva with some edema in its lower and outer part, and a bluish discoloration over the inner third. Over the central part of the mass was another bluish discoloration 7 or 8 mm. in diameter, and slightly elevated which did not disappear under pressure. There was no tenderness or

soreness around the mass on palpitation. It was freely movable in all directions except from the lower inner quadrant; even there it did not appear to be attached to the periosteum.

The patient was able to wear a shell eye over the mass without the appearance of proptosis, but the laxity of the lower lid gave the appearance of an ill

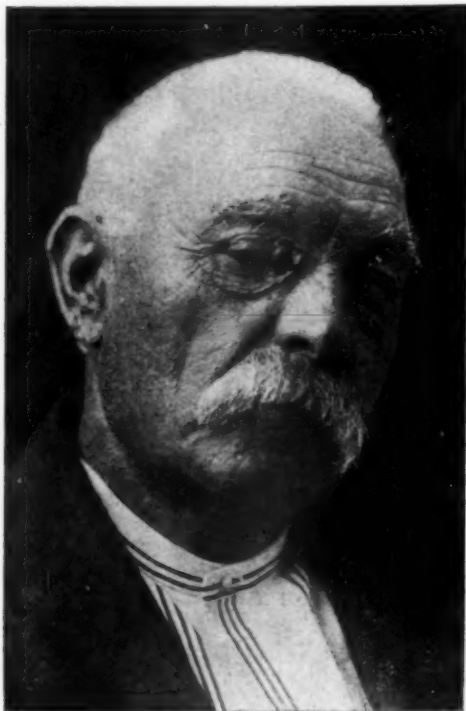


Fig. 5. Epithelioma of right upper and lower lid, July 11, 1917, before treatment with radium.

fitting eye. The preauricular or submaxillary glands were not swollen or tender. The condition was diagnosed sarcoma of the orbit. Feb. 28, 1918, 50 mg. of radium were inserted directly into the tumor and left in place twenty-four hours. The patient returned for observation April 23. The greater part of the tumor had disappeared altho there was a slight thickening in the inner and lower part of the orbit. At that time 100 mg. of radium were inserted into this part of the orbit for twelve hours. The patient returned again June 26 with the condition entirely cleared up (Figs. 1 and 2).

#### EPITHELIOMA OF THE CORNEA.

CASE 230977. A man, aged 59, was examined May 10, 1918. One year before the patient had noticed a growth which started as a small, red elevated area near the limbus of the left eye. Growth was rapid and continued until

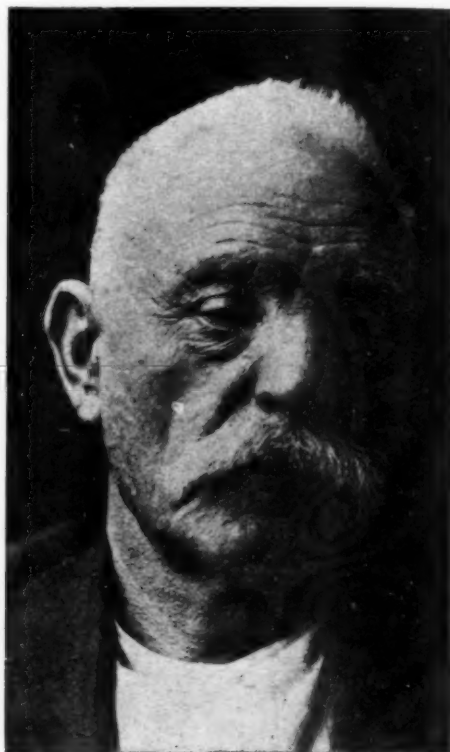


Fig. 6. Same as Fig. 5, Oct. 26, 1917, after treatment.

the nasal half of the cornea was covered by a granular, elevated, sloughing mass. Epithelioma of the cornea was diagnosed.

A 50 mg. tube of radium was used daily in half hour treatments over the area on the cornea, for a period of ten days. The eye was cocaineized, a self retaining retractor was inserted, exposing an area the size of the lesion to be treated, and the radium held in place with a lead applicator.

July 29, 1918, all macroscopic evidence of epithelioma had disappeared from the cornea. There was some roughness of the ocular conjunctiva

near the limbus, on the nasal side, which extended over on the cornea for about 1 cm. in the region previously occupied by the tumor mass. The cornea was slightly vascular and infiltrated. There was no elevation and no fibrous scar tissue. The visual acuity of 6/60, which the patient pos-

sees shoe shaped epithelioma, involving the inner half of both upper and lower lids and the inner canthus of the right eye. This mass was elevated, indurated, and pink. It was covered by small scabs and a greyish discharge. The palpebral and ocular conjunctiva also showed moderate congestion. (Fig. 5.)

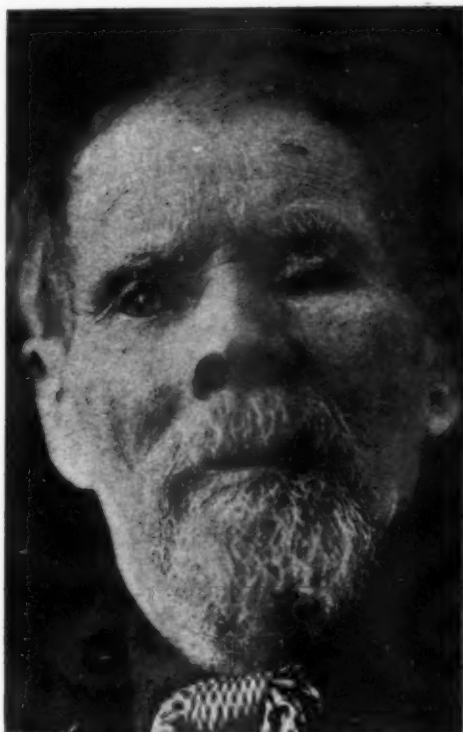


Fig. 7. Epithelioma perforating the left upper lid, Jan. 6, 1917, before treatment with radium.

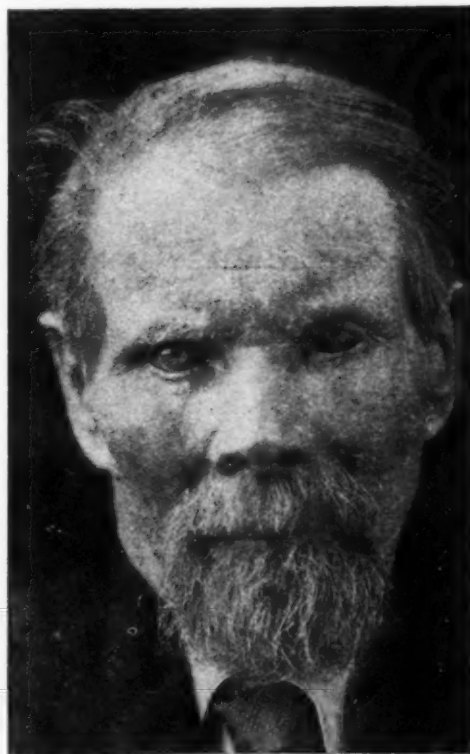


Fig. 8. Same as Fig. 7, March 27, 1917, after treatment.

sessed at the time of the first examination, was not decreased (Figs. 3 and 4).

#### EPITHELIOMA OF THE RIGHT UPPER AND LOWER LIDS.

CASE 200985. A man, aged 67, who was examined July 10, 1917, stated that ten years before a slight growth had appeared at the right inner canthus. Two years later, the growth having extended, a plaster was applied over it and part of the tissue removed. The lids apparently healed, but about six years later the growth recurred. On examination the lids showed a horse-

The patient was given twenty-six hours of treatment with a 50 mg. tube of radium; the treatments extended from July 12 to July 27. Two months later radium was again applied for twenty hours, a 50 mg. tube being used daily from August 31 to September 12.

The eye and surrounding tissue were protected during these applications by a 2 mm. lead screen. No screening of the radium was used, except the container, which is a silver tube (Figs. 5 and 6).



# BLASTOMYCOSIS OF THE RIGHT LOWER LID.

CASE 205095. A boy, aged 17, was examined August 15, 1917, for a growth on the inner two-thirds of the right lower eyelid. This growth was about one and one-half inches long and one-half inch wide; it involved the lid margin, the conjunctiva, and the skin below the lid. The surface was scaly and brown. A diagnosis of blastomycosis was made. A 50 mg. tube of radium was applied over the diseased area on the lid, daily for six days; the total time of exposure amounted to ten hours. The eye and the tissues surrounding the lesion were protected by 2 mm. of lead. The patient was given a prescription for potassium iodid and advised to return in six weeks, at which time the growth on the lower lid was entirely cleared. A new area of the disease, however, had appeared on the right upper lid, which received ten hours exposure of a 25 mg. plaque of radium during the next four days.

December 12 the patient returned with no recurrence, but at this time the reaction from the last application of radium had not entirely subsided. A recent letter states that his trouble has not recurred.

# EPITHELIOMA PERFORATING THE LEFT UPPER LID.

CASE 182293. A man, aged 76, with an epithelioma on the left upper eyelid, was examined Jan. 6, 1917. The growth had appeared nine years before, and a physician had cauterized it at intervals for the past one and one-half years. This epithelioma involved the entire upper lid, and extended into the upper part of the orbit, perforating the lid.

Twelve hours of applications of a 50 mg. tube of radium and one hour of a 25 mg. of radium plaque were given the patient over a period of ten days. The last photograph taken March 27, 1917, shows the condition to be entirely healed (Figs. 7 and 8).

# BIBLIOGRAPHY.

1. Butler, T. H. Some remarks upon spring catarrh, with special reference to its diagnosis and its treatment with radium. *Brit. Jour. Ophth.*, 1917, i, 411-415.
2. Cohen, M. and Levin, I. The action of radium on cataracts. *Jour. Am. Med. Assn.*, 1919, lxxiii, 1193-1200.
3. Heckel, E. B. Report of a case of melanosaarcoma of the orbit, treated with radium. *Arch. Ophth.*, 1916, xlv, 465-468.
4. Horsley, Sir V. and Finzi, N. S. The action of filtered radium rays when applied directly to the brain. *Brit. Med. Jour.*, 1911, ii, 898-900.
5. Lawson, A., and Davidson, J. M. Radium therapy in eye disease. *Brit. Med. Jour.*, 1910, ii, 1491-1497.
6. New, G. B. Angioma and radium. *Journal-Lancet*, 1917, xxxvii, 445-448.
7. Pusey, W. A. Treatment of vernal conjunctivitis with radium: Technic. *Jour. Am. Med. Assn.*, 1918, lxxi, 806-807.
8. Ryerson, G. S. On the use of radium in ophthalmology. *Canad. Med. Assn. Jour.*, 1911, i, 1185-1190.
9. Williams, F. H. Use of radium in some diseases of the eye. *Boston Med. and Surg. Jour.*, 1904, cl, 559-561.
10. Williams, F. H. Early treatment of some superficial cancers, especially epithelioma, by pure radium bromide rather than operation or x-rays. *Jour. Am. Med. Assn.*, 1908, li, 894-897.
11. Williams, F. H. and Ellsworth, S. W. Treatment of superficial new growths by pure radium bromide. *Jour. Am. Med. Assn.*, 1913, lx, 1964-1967.



## FREE DERMIC GRAFTS FOR THE CORRECTION OF CICATRICIAL ECTROPION.

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This paper gives its author's reasons for preferring free dermic grafts for the correction of this condition, and explains the technic of their application and the subsequent dressing required. Read before the American Academy of Ophthalmology and Otolaryngology, October, 1919.

Cicatricial ectropion is recognized as a difficult condition to handle satisfactorily. To get rid of the scar tissue responsible for the deformity, to cause the eyelid to lie accurately against the eyeball at the proper level, to get the effect of proper outline of the lid margins, to enable the patient completely and easily to close the lids, without adding any appreciable deformity in the process—this is not easy. On account of the exposure of the eye caused by the ectropion and on account of the glaring deformity, the correction of this condition is decidedly important. Thru the contraction of the scar tissue and the overflow of tears the tendency is for the deformity to increase, if it is not rectified by operation.

Unfortunately, no method of treatment has been generally agreed upon as superior to all others. In my mind the choice is made. For most cases of scar ectropion, transplantation of free dermic grafts offers by far the most satisfactory means of correcting the deformity. After a study of methods and comparative results obtained in wounded soldiers, no doubt is left in my mind. All of the ophthalmologists who served on the eye service at Fort McHenry while most of the lid repair work was going on, thought alike on this point, and I have reason to believe that visitors who observed cases with us were impressed with the value and suitability of the method.

Cicatricial ectropion occurs much more commonly in the lower lid than in the upper, and in war wound cases it is often associated with fracture of the orbital margin and the bony structures nearby, particularly the superior maxillary and malar bones. Often, too, the ectropion is only one of several deformities. But correction of the ectropion is always very important.

It is not my desire to deprecate the value of other methods of caring for ectropion of the cicatricial type, but I should like to make it clear that my conviction is that no other method offers correction of the deformity with as good cosmetic appearance as the use of inlays of free dermic tissue. There are two other important means of handling cicatricial ectropion, namely, the use of epidermic grafts by one of several methods, and the use of pedunculated dermic flaps. In considering the choice of method one cannot keep back the thought that the skill with which any operation is conducted is fully as important as the choice of operation. This certainly is true in regard to the matter under consideration.

But a few things are unquestionably evident. One is that, for a rule, skin characteristics are carried better by grafts made up of epidermic and true skin than can be possible by transplanting grafts of epidermis only, without the elements of true skin. Both theoretically and practically this is so. Thiersch (epidermic) grafts are best suited to cases of severe burns of the face with consequent loss of the normal color, texture and characteristic appearance of the facial tissues. In such cases the Thiersch graft is liable to match well the surrounding burned skin. Moreover, in some cases of the comparatively rare condition of ectropion of the *upper* lid the epidermic graft does well because it becomes inconspicuous in the shaded folds in this location. But here, even, the dermic graft gives a better cosmetic appearance, as a rule.

Pedicle flaps often fail partially of their purpose, and not uncommonly give the patient a grotesque appearance. These flaps must be taken thick or their life is imperilled. Thick flaps

are manifestly undesirable for lid grafts. Passive congestion, which leads to the death of all or parts of so many pedunculated flaps, does not have to be taken into consideration in the use of epidermic or dermic detached grafts. Their life depends on contact with the underlying tissues, and blueness and death from impairment of old circulation cannot result. Anemia in thin free grafts is quickly followed by new vascularization and vitalization,

The favorite sites for the removal of true skin for grafting are the inner surface of the arm, the temple and the upper eyelid. The arm graft is the most difficult to take, the most difficult to prepare and the slowest in assuming the characteristics of the surrounding tissues of the lids. It takes several months for the arm grafts to take on the proper color and in some cases they never do match quite accurately. The inlays from the temple



Fig. 1. Cicatricial ectropion of right lower lid. Dotted line shows position of primary incision.

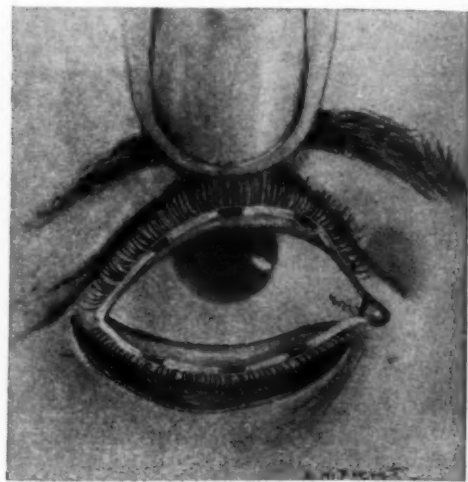


Fig. 2. Upper and lower eyelids everted to show denuded areas on lid margins where adhesions will form to hold eyelids together.

provided proper contact with healthy underlying soft tissue is given.

In using pedicle flaps it is not possible, with safety for the flaps, to accurately match the needed shape, which is almost always fusiform or crescentic. This is a serious handicap, particularly in view of the fact that in attempting to correct one deformity another appreciable deformity is made and subsequent secondary operation is almost invariably necessary. Much may be said in favor of pedicle flaps for many plastic procedures, but I know of little in their favor for lid work. Right here let me add that, if I mistake not, nothing has hampered the progress of plastic surgery so much as the idea that pedunculated attachment is necessary for the life and well being of grafts.

match well in color immediately, and (if not too thick) in texture more quickly than arm grafts. The inlays into the lower lids from the upper lids match in all characteristics from the start. Little wrinkles and creases form early and two weeks after transplantation it is actually impossible in some cases to be sure of the outline of the grafts without putting the tissues on the stretch. These upper lid grafts are really beautiful and at Fort McHenry we found ourselves using them in preference to other grafts where only small inlays were used. The widest graft that we took from the upper lid was 20 mm. in width. There is no difficulty or risk in getting a length of 40 mm.

**OPERATING TECHNIC.** Let us assume ordinary cicatricial ectropion of

the lower lid. Restoration of the lid to its proper position, securing it in position, and preparation of the bed into which the graft is to be laid are important. A skin incision is made ordinarily a few mm. from the lid margin, approximately parallel with it and of about the same length as the palpebral fissure (Fig. 1). The subcutaneous scar tissue should be carefully and thoroly dissected out. As a rule there is more cicatricial tissue than there appears to be, and one cannot be too painstaking in getting this

lying tissue is sliced away from the lid margin with a fine knife, such as a cataract knife, at three corresponding places in the upper and lower lid margins, with care not to injure the cilia follicles. These little denuded areas should be about three millimeters long and should be placed approximately in the center and midway between the center and each end of the lid margin. It is important that the position be the same in the upper lid as in the lower (Fig. 2).

Then sutures are placed to hold these



Fig. 3. Sutures introduced to hold eyelids together. Sutures have been passed thru denuded areas on lid margins, and tied on small rubber plates.

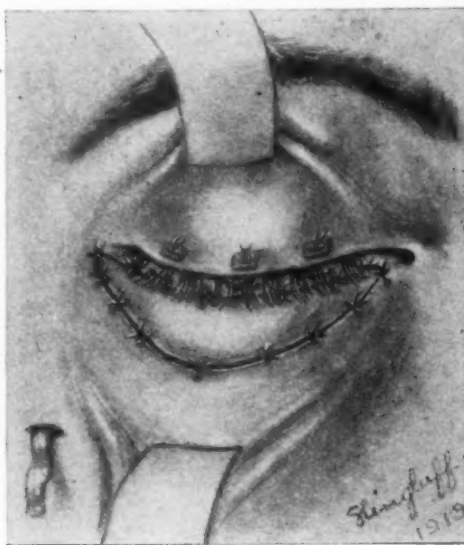


Fig. 4. Graft sutured in position. Area put on the stretch by adhesive strips. Wick drain has been introduced.

all out of the lid. Care should be taken not to injure cilia follicles, tarsus or conjunctiva, and muscular tissue should not be sacrificed unnecessarily. After this dissection is completed, the lid should easily go back into position.

If the eyeball has been enucleated the lid margin should be anchored upward and backward to the orbital contents by sutures, in a position of over-correction. If the eyeball remains, the upper and lower lids are sewed together and made to adhere to each other. This is important. The method practiced by Weeks is excellent. The epithelium with a little of the under-

denuded areas in close apposition. Double armed sutures are used. The needles enter the skin of the lower lid near the margin and pass thru the denuded areas of the lower lid margin. Then entering the denuded areas of the upper lid margin, come out thru the skin near the eyelashes and are snugly tied. If the sutures are passed thru little rubber plates they will not cut into the skin under the dressing (Fig. 3).

After the lids are secured in this way, the raw surface which is to receive the graft should be put on the stretch by adhesive plaster above and below, or better by relaxation sutures tied over

little plates of rubber, little gauze pads, pearl buttons or some other material so that the sutures will not cut in. When this process is completed the smooth raw surface which is to receive the graft is stretched and usually of imperfect crescentic or fusiform shape. There should be no ligatures in this bed and there should be no opening into the conjunctival sac. In the dissection, pressure and pinching of vessels with artery clamps will control hemorrhage; and there need be no fear of postoperative hemorrhage, as a very firm pressure dressing is applied.

a dermic graft can be taken without taking hold of it with forceps or pinching it with anything. Traumatism to the tissues prepares them for death and not for life. I feel strongly about this.

After removal, skin from the arm is found to be elastic and it has a disagreeable tendency to curl. Skin from the upper eyelid has these characteristics to a much lesser degree, and that from the temple practically none at all. The temple skin lies flat and is very easy to handle. All subcutaneous tissue should be cut away by laying the graft on a pad of



Fig. 5. Photograph taken two months after operation. Lower eyelid is supported by adhesions between lid margins. Dotted line gives outline of dermic graft.

**TAKING THE SKIN GRAFT.** The stretched denuded area to receive the graft should be measured, or a pattern of the area can be cut if the operator wishes. If the skin is to be taken from the inner surface of the arm the length and breadth of the graft should be about  $\frac{1}{2}$  greater than those of the stretched bed on which it is to be placed. If taken from the temple or upper lid the dimensions need be only slightly greater than those of the bed, as there is practically no immediate contraction of this skin when removed. Of course in mapping out the incisions for the graft the skin should not be stretched with the fingers but left relaxed. In dissecting up the skin, care should be taken not to injure the graft unnecessarily. After practice

gauze saturated with warm salt solution, and snipping away subcutaneous tissue with flat scissors. When this is done the graft should look anemic. The temple graft looks and feels slightly granular, as well. In preparing dermic inlays one need not fear making angles or points, as they will take as surely as any part. After preparing the graft the surgeon sews it in place with interrupted sutures. These should be carried through just at the margins of graft and surrounding skin (Fig. 4). For this purpose fine silk impregnated with wax or paraffin is satisfactory. It is proper here, too, to caution against traumatism in handling the graft and surrounding tissue. Too much respect cannot be shown to the tissues concerned.

**DRESSING.** I am in the habit of put-



ting a very thin smear of sterile vaselin over the graft. If too much is applied there is the possibility that a little will get under the graft. Then a small piece of rubber tissue is applied with a few perforations along the palpebral fissure to allow conjunctival secretion to escape. There should be no perforations over the graft itself. Gauze fluff is then carefully placed over the rubber tissue and packed in such a way as to fill in depressions and enable the surgeon to get firm even pressure on the graft. The gauze is secured by adhesive plaster.

I like to entirely cover the dressing with strips of adhesive, putting them on like clapboards, as snugly as possible. There seems to be no danger to the graft from too much pressure. Over this should be applied a *firm* bandage, and it is well to cover the fellow eye by a separate dressing that can be removed after two or three days of absolute quiet. I cannot lay too much stress on *firm, evenly distributed pressure* on the graft from the dressing. For its life the graft is dependent on absolute contact with the underlying tissue, and parts that are not in contact will usually die. Ignorance of this idea has led to many failures in handling nonpedunculated grafts. Pressure will not interfere with capillary vascularization.

Before sewing up the wound occasioned by removal of the graft there should be free undermining of the skin, and relaxation sutures should be put in so that the margins of the skin flaps will be under complete relaxation, and marginal sutures should be put in to insure accurate apposition. "Dermal" suture

material is satisfactory for both the relaxation and marginal sutures. The relaxation sutures can be omitted if the graft is taken from the upper lid.

The dressings should be left on for four days without disturbance. In cool weather it may be wise to leave them for five days. Sutures under tension should be removed at the first dressing. Others may be left a few days more. It is important that the graft should not be disturbed in any way at the first dressing. After very careful removal of secretion with small cotton sponges, rubber tissue and dressing are replaced and a bandage applied with pressure. This may be removed again in two days and then dressings may be done daily.

It is well to keep rubber tissue over the graft for about two weeks. By this time usually the epithelium has been thrown off and the graft is perfectly secure. Massage with vaseline should then be started and continued daily until the grafted tissue is perfectly pliable, or until the adhesions between the lids are cut. These adhesions should be left for three months or more to insure complete correction (Fig. 5). Usually they stretch out somewhat, but always they keep the lid supported, and when the fellow eye is open or in the attempt to use the eye on the operated side the upward pull from the upper lid keeps the grafted tissue on the stretch and the lid in contact with the globe. Also the movements of the upper lid help to make the graft pliable. Little folds and creases develop in the graft which help to give a natural appearance. No permanent deformity results from the adhesions between the lid margins.



## EARLY SURGICAL TREATMENT OF BURNS OF THE CONJUNCTIVA.

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In the case here reported the tissue burned by chlorinated lime was immediately removed, and mucous membrane from the lip used to replate it. Speedy healing and excellent result followed. This plan is advocated for cases in which there is danger of infiltration of the cornea.

In his article on "Treatment of Symblepharon, etc.," published in the *AMERICAN JOURNAL OF OPHTHALMOLOGY*,<sup>1</sup> Dr. Wm. H. Wilder remarks on the early treatment of burns of the conjunctiva:

"In any such case, in which the conjunctiva is destroyed in whole or in part, the eschar must be cast off before healing can begin. Granulation tissue develops to replace the lost substance and from this fibrous or cicatricial tissue forms. Two granulating apposed surfaces will certainly grow together in spite of frequent attempts to separate them, unless epithelium forms over the surface to prevent it. But it is just in such cases as these, in which the tissues have been injured by heat or the corrosive action of chemicals, that the regenerative power of the epithelium seems to be impaired."

"It is at this stage that the surgeon can come to the help of nature, and by aiding in the epithelization of the wound prevent much of the cicatrization that will inevitably produce great deformity if not checked. As soon as it is evident that the wounded surface is clean and granulation is well underway, attempts should be made to cover the raw surfaces with epithelium, for the sooner this is accomplished, the sooner will the formation of cicatricial tissue be checked."

While Wilder's article reflects the general viewpoint of waiting until granulation is well underway, I advocated as far back as 1912<sup>2</sup> immediate surgical interference for severe burns of the conjunctiva, consisting in removing the burned conjunctiva, if necessary all around the cornea and replacing it by mucous membrane from the mouth.

The majority of my cases were lime-

burns, some ammonia burns, and one was a burn caused by the contents of a golfball. As regards the limeburns, they constitute the majority of these cases and are therefore the most important. They may be divided in three groups, according to the intensity of the burn:

The mild cases will take care of themselves under the usual treatment. The severer ones may do the same, but they will require immediate grafting if some days after the accident—usually between the third and seventh day—secondary infiltrations of the cornea begin to set in. They are the result of an impairment of the quantity and of the quality of the nutritive material of the cornea, due to decomposing chemical processes in the burned conjunctiva. Only immediate surgical interference, grafting, will clear up the secondary infiltrations of the cornea, as I have seen in a number of cases.

To the third group belong such cases in which the conjunctiva is destroyed, nearly or entirely. It is just such a case I wish to report:

### CASE REPORT.

Frank T., about 50 years old, entered the Lenox Hill Hospital with the history of a limeburn accident on September 9th, 1919. I saw the case about three hours after the accident had taken place. The patient stated, that while removing the top of a tin can, containing chlorinated lime, it all of a sudden "exploded," the shower of lime dust striking both his eyes. He cleaned his eyes as best he could and went to the hospital.

I found the lids of both eyes very much swollen, the right one more than the left. On forcing open the right eye, I discovered a lot of dark brown

detritus between the lids. The whole conjunctiva of the eyeball and of both culdesacs showed the same condition. I immediately proceeded to clean the eye and to remove this detritus, which on examination proved to be the remains of the destroyed conjunctiva. It was seen that the bulbar conjunctiva was destroyed in whole and that of the culdesacs very extensively burned; also the cornea showed numerous burns.

The left eye had fortunately escaped such serious damage and offered some chances of recovery without an operation, at least I decided to wait and do a grafting only if within the next few days secondary infiltrations of the cornea should occur.

As far as the right eye was concerned there was no hope, except such as an immediate transplantation of mucous membrane of the mouth could offer. This was done five hours after the accident in the presence of my assistant, Dr. Pagenstecher and of Dr. M. F. Claffey of the eye service of the Lenox Hill Hospital. The burned remains of the bulbar conjunctiva were carefully removed far into the culdesacs, both of the upper and lower lids; and the defect covered by two large grafts, one along the upper and the other along the lower circumference of the cornea. Two double grafts were used for the purpose of avoiding the contracting and encroaching on the cornea, which ensues, where a single circular graft is used.

Both eyes were covered with light linen eye pads. The right eye was not opened till the 6th day; the pads were changed three times a day, the secretion removed and a drop of atropin instilled between the lids near the caruncle once a day. The left eye was treated the same way and on the 3d and the following days was cautiously inspected to ascertain if any infiltration of the cornea were taking place; this did not occur.

On the 6th day the pads were removed; the swelling of the lids slowly went down; and the patient was discharged on the 16th day after the ac-

cident, with the left eye in good condition and the right eye doing splendidly. There was no irritation or inflammation present, the cornea looked clear, and only by the aid of focal illumination multiple nebulae could be detected, the result of the direct contact of the burning substance. A tiny adhesion, which had formed between the upper lid and the corneal edge of the flap, was cut with the scissors on the tenth day; a similar one between the culdesac of the lower lid and the edge of the graft was not touched, as it did not interfere at all with the free movements of the eyeball. The sight of the left eye, on December 28th, 1919, was 20/30. There are some nebulae to be seen in the pupillary region of the cornea, the sight of the right eye was 20/200 (irregular astigmatism).

Regarding technic I wish to refer to my article on "Transplantation of the Mucous Membranes of the Mouth for Serious Diseases and Burns of the Cornea."<sup>3</sup>

Attention has been called to the greater prevalence of burns of the eye due to the increase of chlorinated lime for household purposes.<sup>4</sup>

"The care of such cases usually includes anesthetization with a few drops of 1 per cent solution of holocain, or a 4 per cent solution of cocain, and then the removal of the remaining particles of the lime. The irrigating fluid should be a weak solution of vinegar to neutralize the caustic effect of the lime. Subsequently, cold applications may be applied to the closed lids, and a mild antiseptic, such as a boric acid solution, dropped into the eye every two or three hours. The most serious and important sequel is the adherence of the lid to the globe (symblepharon), when there are two opposing raw surfaces. In an endeavor to prevent these accidents, the national committee took up the matter with manufacturers and distributors. The latter report that chlorinated lime decomposes when exposed to high temperature or to dampness. To avoid accidents, it is recommended that a small

hole be punched in the container to allow the gas pressure to be released before the top is taken off the can."

I wish to emphasize once more the

necessity of *immediate* grafting, as outlined above, for severe burns of the conjunctiva, as the only way of saving eyes, that are otherwise doomed to destruction.

#### REFERENCES.

1. Amer. Jour. Ophth. v.2., p.808.
2. Denig. Münch. med. Woch., 1912, No. 11.
3. Denig. New York Med. Jour., June 8th, 1918.
4. Jour. Amer. Med. Assn. Dec. 6, 1919.

## THE RELATION OF THE SIGHTING EYE TO THE MEASUREMENT OF HETEROPHORIA. A PRELIMINARY REPORT.

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SAN FRANCISCO.

The investigation reported in this paper grew out of the studies of heterophoria made at the Medical Research Laboratory, Mineola, L. I. It seems to show that it is a matter of practical importance in measuring heterophoria to permit the sighting eye (that which habitually fixes an object) to fix the test; and to place the Maddox Rod in front of the other eye, thus bringing out the maximum error.

When the eyes are alternately covered and uncovered in the screen test, one eye is frequently seen to make a greater excursion of redress than the other. Occasionally a careful observer during the parallax test notices that the image jumps farther when the screen is moved in one direction than when it is moved in the other. Such observations are common in the experience of ophthalmologists who employ these two excellent tests, and some confusion not infrequently arises in trying to select a prism that will neutralize both movements. In the interest of accurate procedure it is necessary to determine which of these two unequal eye movements indicates the true deviation of the visual axes.

It is evident from the technic of the screen test that the two unequal degrees of deviation depend upon the fact, that the rôle of fixation is given to each eye in turn. The stimulus received by the retina of the eye fixing the test object determines the direction of both visual axes when the other eye is screened. A study of the problem in hand therefore depends upon an investigation of the effects of right and left eye fixation on the measurement of heterophoria.

The screen test is not easily adapted

for making the measurements desired in this investigation. The technic of measurement advocated in this test is to place prisms of constantly increasing strength before one eye, until the direction of movement of the eye is observed to be reversed. From this amount of prism, 2 is deducted and the result called the measurement of the original movement.<sup>1</sup> This procedure is practical for clinical use but is subject to a possible error of one prism dioptre<sup>2</sup>, an amount too high for the purpose of this investigation where small amounts of heterophoria must be exactly measured.

The parallax test gives an exceedingly exact result; but, being subjective in character, its success depends upon the ability of the observer to see the apparent movement of the test object when the eyes are alternately screened. The fact that some observers are unable to see this movement limits the application of the test.

Other tests for heterophoria in common use are not readily available for this purpose because their technic is such that fixation of the test object by one or the other eye is not under the control of the examiner. It was not until the Maddox Rod Screen Test<sup>3</sup> had been in use in this laboratory for

several weeks that a means was recognized for making the desired measurements in a simple and accurate manner.

Either eye in this test may be selected for light-fixation, the other being covered by the Maddox rod. The fixing eye thruout the test is kept in the natural primary position, uninfluenced by any prism, screen or other device. The Maddox rod before the other eye is covered by a screen which is removed for an instant and replaced, allowing a brief view of the line of light. If the line does not pass thru the spot of light, a rotary prism is placed in front of the Maddox rod and rotated while other brief exposures of the line are made until finally a degree of prism is obtained that causes the line to pass thru the light every time the screen is removed. This prism is the measure of the deviation of one eye in relation to the other which fixes the light. It is obvious that a second measurement can be obtained by selecting the opposite eye for the rôle of light-fixation.

This test has been made on both eyes of 100 observers, 50 of whom were aviators and medical officers connected with the Air Service. The remaining 50 were patients in several New York Ophthalmological Clinics. The appa-

ratus used in the Medical Research Laboratory was a DeZeng phorometer trial frame, equipped with a pair of Maddox multiple rods and a pair of Risley rotary prisms. The phorometer attachment of this apparatus was not used. In the clinics, the tests were made with a trial case multiple red rod, held in position by a trial frame, measurements being made by trial case prisms or a portable rotary prism. The sighting or dominant eye of each observer was ascertained by having him locate a distant light thru a hole in a large card held in both hands.<sup>4</sup>

In the first half of the appended table are grouped the aviators and medical officers. The aviators were comparatively free from refractive errors which might influence the test. The medical officers were tested while wearing their refractive corrections. The second half of the table contains the data concerning the clinical patients. The visual acuity recorded for this group is not as high as for the first one. Those who wore glasses were tested with the glasses in place. The rest were free from the suspicion of having more than a moderate amount of refractive error. All individuals having a marked inequality of vision of the two eyes were excluded from both groups.

TABLE.

Abbreviations: Esophoria, S; exophoria, X; right hyperphoria, RH; left hyperphoria, LH.

No.	Age	Sex	Visual	Acuity	Sighting Eye	Maddox rod measurements when light is fixed by:	
						R. F.	L. F.
1.	25	M	20/15	20/15	Right	S3	S2
2.	21	M	20/20-2	20/15	Right	X2	S1
3.	34	M	20/20	20/20-5	Right	S2	S3
4.	21	M	20/15-4	20/15-5	Right	S2	S½
5.	24	M	20/20-3	20/20-3	Right	X4	LH2 X3 LH½
6.	22	M	20/15	20/15	Left	S1½	S2
7.	52	M	20/15-3	20/15-3	Right	S2	S1
8.	22	M	20/15	20/20-2	Left	S1	LH½ Ortho.
9.	24	M	20/15	20/15	Either	X2	X1
10.	20	M	20/20	20/20	Right	S3	S½
11.	23	M	20/15	20/15	Left	S2	S2
12.	22	M	20/15	20/15	Left	X1	S1
13.	25	M	20/20	20/20	Right	S1	Ortho.
14.	21	M	20/15	20/15	Left	S1½	S1½
15.	23	M	20/15	20/15	Right	Ortho.	Ortho.
16.	29	M	20/15	20/15	Right	X9	X5
17.	36	M	20/15	20/15	Right	Ortho.	Ortho.
18.	27	M	20/15	20/15	Right	S4	S2
19.	30	M	20/15	20/20-6	Left	S1	LH½ S2 LH2
20.	25	M	20/20	20/20	Left	S4	S2½
21.	21	M	20/30	20/30	Right	Ortho.	Ortho.
22.	22	M	20/20	20/20	Right	Ortho.	Ortho.



23.	24	M	20/30	20/30-4	Left	S $\frac{1}{2}$	S1 $\frac{1}{2}$
24.	22	M	20/20-7	20/20-7	Right	X2	X $\frac{1}{2}$
25.	22	M	20/15	20/15	Right	S3 $\frac{1}{2}$	S2
26.	25	M	20/15	20/15	Right	S4	S3
27.	27	M	20/15	20/15	Right	S4	S2 RH $\frac{1}{2}$
28.	26	M	20/15	20/15	Right	S1 $\frac{1}{2}$	S $\frac{1}{2}$
29.	23	M	20/15	20/15	Left	S $\frac{1}{2}$	S2
30.	25	M	20/20-5	20/20-4	Right	S2	S $\frac{1}{2}$
31.	23	M	20/20-6	20/20-6	Right	S4	S $\frac{1}{2}$
32.	26	M	20/15	20/20-6	Left	S $\frac{1}{2}$	S1 $\frac{1}{2}$
33.	21	M	20/15-2	20/15-1	Left	X1	X3
34.	23	M	20/20-6	20/20-7	Right	S4	S1 $\frac{1}{2}$
35.	26	M	20/20-1	20/20-3	Right	S2	S1
36.	29	M	20/15	20/15	Right	X2	X $\frac{1}{2}$
37.	26	M	20/20-7	20/20-7	Right	S3	S2
38.	26	M	20/20	20/30-5	Left	Ortho.	Ortho.
39.	26	M	20/15	20/15	Right	X4	X2 $\frac{1}{2}$
40.	25	M	20/15	20/15	Right	S1 RH $\frac{1}{2}$	S1 RH $\frac{1}{2}$
41.	33	M	20/15	20/15	Right	S1	S1
42.	28	M	20/15	20/15	Right	X3	X $\frac{1}{2}$
43.	21	M	20/15	20/20-4	Right	S4	S3
44.	25	M	20/15	20/15	Right	S5	S2
45.	24	M	20/15	20/15	Either	S1	S2 $\frac{1}{2}$
46.	27	M	20/20-6	20/20-6	Right	S1 $\frac{1}{2}$	S1
47.	24	M	20/20-7	20/20-7	Right	X3 $\frac{1}{2}$	X1 $\frac{1}{2}$
48.	25	M	20/15	20/15	Right	S1 $\frac{1}{2}$	S1 $\frac{1}{2}$
49.	30	M	20/15	20/15	Left	Ortho.	X2 LH1
50.	22	M	20/15	20/15	Right	S1 $\frac{1}{2}$	S1 $\frac{1}{2}$
51.	30	F	20/20-1	20/20	Left	S8	S8
52.	11	M	20/20-4	20/20-6	Right	S2 $\frac{1}{2}$	S1 $\frac{1}{2}$
53.	30	M	20/30-4	20/30-4	Right	X2	X $\frac{1}{2}$
54.	31	F	20/20-3	20/20-4	Left	X3	X3
55.	34	F	20/20-4	20/20-3	Right	S17 LH2	S9 $\frac{1}{2}$ LH1
56.	36	F	20/20-2	20/20-1	Right	S1	S1
57.	20	F	20/20	20/20	Right	X7	X5
58.	14	M	20/15	20/15	Right	X2	Ortho.
59.	16	M	20/20	20/20-3	Right	X2	X2
60.	10	F	20/20	20/20	Right	S6 RH $\frac{1}{2}$	S4 RHO
61.	16	F	20/30	20/30	Left	X27	X9
62.	16	M	20/20-2	20/15	Either	S1	S3
63.	10	M	20/20	20/20-4	Right	Ortho.	Ortho.
64.	9	M	20/20-2	20/20-4	Right	S1 $\frac{1}{2}$	Ortho.
65.	19	M	20/20-4	20/15	Right	S2	S $\frac{1}{2}$
66.	16	M	20/20-1	20/20-1	Right	X3	X $\frac{1}{2}$
67.	11	M	20/20	20/20-4	Right	X3	X1 $\frac{1}{2}$
68.	8	M	20/30-5	20/20	Left	X10	X8
69.	48	F	20/30	20/30	Right	S1 $\frac{1}{2}$	Ortho.
70.	13	M	20/20	20/20	Right	S2	S1
71.	16	M	20/20-2	20/20-1	Left	X2 $\frac{1}{2}$ LH $\frac{1}{2}$	X4 LH $\frac{1}{2}$
72.	21	F	20/20	20/30-4	Right	S4	S2
73.	18	F	20/20-1	20/20-4	Left	X3	X4
74.	11	M	20/20-2	20/20-2	Right	X2	Ortho.
75.	34	M	20/30-6	20/20	Left	S11	S14
76.	10	M	20/20	20/20	Right	X2	X $\frac{1}{2}$
77.	15	M	20/15	20/20-5	Left	Ortho.	S2 $\frac{1}{2}$
78.	10	F	20/20	20/30-4	Either	Ortho.	Ortho.
79.	9	M	20/20	20/20-2	Left	S2	S3
80.	14	F	20/30-4	20/20	Left	S4	S3
81.	49	F	20/30	20/30-2	Right	X8 $\frac{1}{2}$	X7 $\frac{1}{2}$
82.	13	M	20/20-4	20/15	Left	X $\frac{1}{2}$	X3
83.	16	M	20/30-4	20/30-4	Either	X5	X3
84.	11	M	20/20-2	20/20	Right	Ortho.	Ortho.
85.	10	M	20/20-2	20/20-4	Right	S2 RH $\frac{1}{2}$	S1 RHO
86.	19	F	20/20-1	20/20-1	Either	X7 LH4	X2 LH2 $\frac{1}{2}$
87.	19	F	20/20-5	20/20-2	Left	S5	S6
88.	50	M	20/20	20/20-1	Left	X3	X5
89.	18	M	20/30-5	20/30-5	Either	X2	X2
90.	17	M	20/20-4	20/15	Right	S3	S2
91.	29	F	20/30-6	20/30-6	Right	S10 $\frac{1}{2}$	S8
92.	40	M	20/20-2	20/15	Right	X $\frac{1}{2}$ RH1	X3 RH1 $\frac{1}{2}$



93.	35	M	20/15	20/20-5	Left	S $\frac{1}{2}$	S2
94.	14	F	20/15	20/20-3	Left	S2	S4
95.	13	M	20/20	20/20-2	Left	S1	S2 $\frac{1}{2}$
96.	20	M	20/15	20/15	Right	S1 $\frac{1}{2}$	Ortho.
97.	13	M	20/20	20/20-2	Right	X3 RH1	X2 RH $\frac{1}{2}$
98.	18	M	20/20-2	20/20	Left	Ortho.	Ortho.
99.	15	F	20/20	20/20-2	Either	X2 $\frac{1}{2}$	X1 $\frac{1}{2}$
100.	31	F	20/20-4	20/20-3	Either	X3	X3 $\frac{1}{2}$

The test for the sighting eye demonstrates that 61 observers (61%) use the right eye, 30 (30%) the left and 9 (9%) sight with either the right or left eye without showing a decided preference for either.

Attention is called to the fact that 81% of these observers give two different measurements of the same type of heterophoria as a result of fixation of the light by each eye in turn. This percentage is very much higher than experience with the screen test has indicated.

The data concerning the amount of esophoria, exophoria and hyperphoria, measured when each eye is used to fix the light, may be rearranged for the purpose of studying several different phases of the subject of heterophoria. This report, however, is concerned only with the relation of the sighting eye to the measurement of heterophoria. Out of 61 right-eyed observers, 47 exhibit the greater amount of some form of heterophoria when the right eye fixes the light. Of the 26 left-eyed observers, 19 exhibit the greater amount of error when the left eye fixes the light. The table indicates that when the sighting eye is used to fix the light during the test, the greater amount of heterophoria is exhibited by 66% of the observers, the lesser amount by 7% and the same amount by 17%.

Further analysis of the data does not help determine whether the greater or lesser amount of error represents the true condition of the eyes. If the pur-

pose of the heterophoria test is to measure the maximum error, then the greater amount revealed by giving the sighting eye the rôle of fixation indicates a practical method of performing the test. This will give the greater amount of error in 66% of the tests and be accurate in 17% more where the same amount of error is recorded for each eye. It is possible then in 83% of the tests for heterophoria made by the Maddox rod screen method to measure the maximum error by having the sighting eye fix the light.

In criticism of these percentages it should be stated that the measurements obtained in testing some of the observers are not free from the influence of small refractive errors. It was not possible in this series to refract every observer as a preliminary to the test. The influence of slight turning movements of the head is not entirely eliminated from the findings, altho head movements were guarded against as much as possible without actually fixing the head.

The hundred observers reported here are not enough to bring this problem to a definite solution. Meanwhile, pending the reporting of further tests, no mistake will be made if the Maddox rod is always placed before the non-sighting eye, instead of before the one that happens to be nearer the trial case. The rôle of light fixation should be given to the eye that is used habitually for sighting in the ordinary visual acts of life.

#### BIBLIOGRAPHY.

1. Fuchs-Duane. "Text-book of Ophthalmology" Sixth Edition, p. 767.
2. Duane, Alexander. "The Practical Application and the Relative Value of the Tests Used in Examining the Eye Muscles." *Annals of Ophth.*, April, 1905, p. 304.
3. Dolman, Perc. "The Maddox Rod Screen Test." *Archives of Ophthalmology*. Sept., 1919.
4. Dolman, Perc. "A Consideration of Some Tests for Determining the Sighting Eye."

## TUBERCULOSIS OF THE EYE IN THE ARMY.

H. H. STARK, M. D.

EL PASO, TEXAS.

This paper, based upon the personal experience of the writer at Camp Travis, points out why, in spite of careful examination of recruits, tuberculosis was an important disease in the army. It reports eight cases with some discussion of each. Read before the Colorado Congress of Ophthalmology and Oto-Laryngology, Denver, August 4, 1919.

A casual observer would think that with the repeated examinations of the men chosen to make up the national army—first, by the local examining board, many times by an advisory board, as well as the general and special boards on arrival at camp, no cases of tuberculosis would be found among them. We have only to remember, however, that most of us are but arrested cases, and that these men, who have undergone intensive training, may again become active. Even should activity begin, when the period of training passes, a readjustment takes place and when they have recovered their former weight and resistance, the activity may subside. In the limited number of cases I have treated, I have seen new lesions and new lesions ingrafted on old ones, and I feel there have been many cases of slight activity which have been overcome without the knowledge of the individual.

The handling of tuberculous eye cases in the army was quite a problem. There is a specific order in the manual against the use of tuberculin in the diagnosis of tuberculosis of the lungs. However, the interpretation of the paragraph dealing with this question was thought not to apply to eye cases. The Chief of the Medical Section kindly consented to the use of tuberculin for both diagnostic and therapeutic purposes, so the work was turned over to this section, to be handled under my direction.

One of the questions which was very hard to settle was the length of time this treatment should be continued. It seemed inadvisable to keep the soldier in the hospital, idle, apparently healthy, for a number of months in order to receive one dose of medicine, weekly, long after the acute condition had subsided. It was therefore decided to return them to duty within a short time after the acute stage had passed. Since treating these cases

a number of these men have been discharged from the army. They had no means of continuing the treatment, nor were we permitted, by the regulations, to disclose the nature of the disease. I therefore believe that it is quite possible that some of them may relapse. Should they do so, they will, no doubt, come under the care of the War Risk Insurance Bureau and be handled, in the majority of instances, by the civilian oculists.

### CASE REPORTS.

The following cases came under my care while stationed at the base hospital, Camp Travis, during the winter of 1918-19. They show the class of cases met with among the drafted men, and as each one has special features, I shall give the history and discuss it separately. All of them were privates with the exception of one, who was a noncommissioned officer.

**CASE 1.** Reported at the clinic, November 15, 1918; age 19; white; in the service 5/12 years; from New York state; occupation before entering the service, small arm polisher; general appearance, good, but had a facial expression indicating adenoids in childhood; family history negative; had diseases of childhood, otherwise negative except the right eye.

**History.** He had trouble in his right eye 1½ years ago, which was diagnosed as iritis. This cleared up under treatment in about two months with no trouble up to two days before reporting at the clinic when he noticed some pain and redness.

**Examination.** Right eye, vision 20/50, with all the characteristic signs of acute iritis; fundus, negative, as well as could be determined through the contracted pupil. Left eye, vision 20/20, examination negative. The right eye was placed on atropin, but the pupil refused to di-

late fully, a large synechia up and out holding fast. This condition continued thruout his entire treatment. A routine examination was carried out; ears, nose and throat, teeth, genito-urinary tract, lungs, urine, blood, and provocative Wassermann, all negative. The condition of the eye would be fairly good for a day or two, then it would become very red and painful. Five days after his entrance there could be determined slight elevation of the right disk.

All examinations proving negative for the cause of iritis, consultation was held with the Chief of the Medical Section, who consented to the administration of diagnostic doses of tuberculin. This was the first case ever tested in this hospital, and as the eye was very much inflamed, there was fear of a too decided reaction, so it was thought best to approach it with caution. Accordingly, after the preliminary steps of recording the temperature for 48 hours, which was negative, an initial dose of 1/100 milligramme was given. There was no reaction other than a decided improvement of the condition within 48 hours, at which time he was given 1/10 milligramme, which caused additional improvement. At the end of 48 hours, 1 milligramme was given with no reaction, followed again by two milligrammes in 48 hours, the result of which was a general, focal and local reaction, the temperature rising to 100. A medium sized red spot appeared at the point of injection and the eye showed increased redness. Total amount administered 3.11 milligrammes. During the course of the administration of the tuberculin, the eye made such rapid improvement there was little redness left, so the focal reaction could be readily determined. At the time of the reaction there occurred an increased swelling of the disc amounting to about 5D.

The patient was placed on therapeutic doses of old tuberculin two weeks after the final diagnostic dose, the first being 1/10,000 milligramme, which was increased by this amount each week until the last dose, which was 5/10,000 milligrammes. Under this treatment the eye cleared and the swelling of the disc subsided. During the course of handling this patient in the hospital, his vision

went down to 20/200, going up to 20/70 during the testing with tuberculin. On January 30, 1919, he was returned to his organization which was leaving camp for their home station to be discharged. At this time the vision of the right eye was 20/40, corrected to 20/30 with glasses.

*Discussion.* This was the first case since entering the service in which I used tuberculin, and it was the first case of the kind treated in the hospital. The case had been under treatment several weeks with no improvement—in fact the eye seemed to be getting worse—so I felt that something must be done. In considering it, I was sure that the head of my section in the Surgeon General's Office would approve of my using any procedure in the army which I would use in private practice. The Chief of the Medical Section consented to its use and one of the younger officers of the section was detailed to carry out the test, and from that time on he continued handling cases of this character until he was discharged.

The initial dose was smaller than usually employed, but it proved to be a very wise precaution, as it acted as a therapeutic rather than a diagnostic dose. The nerve condition is not altogether clear in my mind; whether it was due to a direct involvement of the nerve, or of the orbit, I am unable to say. The increased swelling after the reactionary dose clearly indicates, to my mind, that it was of tuberculous character, which was proven by the subsiding of the swelling on continuing the treatment. The case passed from under my observation when his organization returned to its place of enlistment for demobilization. The condition of the eye was such that he could have passed out of the service. However, I think it would have been much better to have continued the treatment for a number of months, as the condition was, no doubt, a recurrence of a former tuberculous iritis.

*CASE 2.* Reported at the clinic January 3, 1919; age 25; white; in the service 9/12 years; from Oklahoma; occupation, clerical work; appearance good; family history, negative; had some of the diseases of childhood, but since that

time had never been sick in bed; gonorrhea twice in 1917, both brief attacks; never had a sore on his penis.

*History.* He could see well with both eyes up to ten years ago, when he noticed black spots before the left eye. This did not bother him much up to about 3½ years ago, when, within a few days, he became almost blind. The eye at this time became red but there was no pain. The first attack subsided in about two months, but the vision did not return to normal. Since that time he has had a number of similar attacks, and had been under treatment for two years before entering the service, during which time several negative Wassermann tests were made, notwithstanding which he was given one dose of salvarsan, possibly a provocative test. There was no improvement in the sight under treatment. He entered the army with a vision of 20/100; since his entrance he had two attacks where the sight became suddenly very obscure, one of these occurring two days before reporting at the clinic.

*Examination.* Right eye, vision 20/30; normal in appearance; fundus normal. Left eye, vision 10/200. Thru the dilated pupil there showed so many fine vitreous opacities that the nerve could only be seen indistinctly, but at the lower part of the fundus was a large, grayish, white mass, about six times the size of the disc, slightly oblong in shape, in a horizontal direction, slightly elevated in the center, with some pigmentation at the edges. Over this mass at the edge, ran several small retinal vessels. Transillumination negative. The pupil was dilated with atropin and a routine examination started. Ears, nose, throat, teeth, genito-urinary tract, lungs, and Wassermann, negative. No marked variation in temperature for three days.

As in the former case the initial dose given was 1/100 milligrammes old tuberculin, followed successively each 48 hours by one, three, five and eight milligrammes, a total of 17.01 milligrammes. On the last dose, the three reactions occurred. The vitreous cleared under the use of atropin and diagnostic doses of tuberculin to such an extent that the fundus could be plainly seen. On the

day of the last dose, there was a vision of 20/70, improved to 20/30 with a pin hole disk. Two weeks after the last diagnostic dose, treatment was commenced with 1/10,000 milligrammes old tuberculin, increasing the same amount weekly until the final dose, which was 5/10,000 milligrammes, at which time he passed from under my observation, due to discharge from the army. The elevation of the choroidal spot had subsided and most of the vitreous opacities had disappeared. Uncorrected vision, thru normal pupils, 20/30.

*Discussion.* I consider this case tuberculoma of the choroid. It is worthy of noting the rapidity with which the improvement took place after bringing the patient up to the point of saturation, the vitreous opacities disappearing very rapidly even before the maximum dose was reached. When the patient was discharged from the hospital, they were very fine and dust-like, through which all parts of the fundus could be plainly seen. The sudden loss of vision I ascribe to hemorrhages which would slowly clear by absorption. Another point is that the soldier entered the service with a vision of 20/100, which was reduced to 10/200 while in the service, but fortunately improving to 20/30 before his discharge—a better vision than he had had for many years. Owing to the size and character of the lesion, I think his trouble is more apt to recur than if the lesion were smaller, and that this patient should have continuous treatment with tuberculin and have close watching for a number of years.

CASE 3. Reported at the clinic January 3, 1919; age 26; white; in the service 11/12 years; from Texas; occupation, clerical work; narrow face with some appearance of adenoids; family history, negative, had diseases of childhood, nothing since; gonorrhea in 1912, lasting three or four weeks; three months before had an infected finger on left hand, resulting in loss of the nail, at which time he was treated for syphilis, altho no blood test was made.

*History.* First noticed trouble with his right eye about eight days ago, but did not pay much attention to it. He was up for discharge and the condition of



the eye was noticed when he came before the examining board, which sent him to the hospital.

*Examination.* Right eye, vision 20/70. Very red with all the symptoms of acute iritis. The pupil was bound down tightly in many places by synechia, in fact almost totally fixed, there being one place of about  $1/5$  of the diameter which dilated under atropin. Left eye, vision 20/20, fundus negative. He was put thru the routine examination, nose, throat, genito-urinary tract, lungs, Wassermann and provocative Wassermann, negative. The teeth were negative to focal infection, but showed Vincent infection of the gum margins, for which he was placed under treatment and reported negative in a short time. Wasserman test was repeated several times on account of his history, but was always negative.

Notwithstanding the negative Wassermann, it was decided by the Genito-Urinary Section that it was best, considering his history, to put him on anti-syphilitic treatment, which was agreed to. He had salvarsan and mercury, with increasing doses of potassium iodid up to 50 drops of a saturated solution, three times a day. Under this treatment there was no improvement in the condition of the eye. On February 16th, 44 days after his admission, iritis developed in the left eye. The pupil was dilated and at the temporal side of the fundus was found a white exudate, triangular in shape, the three points corresponding to the size of the disk. Near this were numerous small, round, hemorrhagic spots, covering an area about 8 times the size of the disc, quite fresh in appearance. Further, towards the temporal edge of the fundus, was some fine, old pigmentation, which had been overlooked on the first examination.

The patient was at once started on diagnostic doses of tuberculin, one, three and five milligrammes, each 48 hours; total, 9 milligrammes. The reaction occurred on the last dose, showing in the left eye by an increase in the size and brightness of the hemorrhagic spots, and a general lighting up of the inflammation in both eyes. The patient was put on old tuberculin, 1/10,000 of a milligramme once a week, increasing this amount each

dose. The condition subsided so rapidly that after the second dose the patient was discharged to duty, and within a short time from the army, with vision in the right eye 20/20; left eye 20/20.

*Discussion.* This was the third case treated and for some time it was thought from his history to be due to syphilis, the patient not making as positive a denial as he should. Had the first eye cleared before the trouble in the second developed, he would have been returned to duty with a diagnosis of syphilitic iritis, and dismissed from our minds as such. But his trouble in the second eye rather forced us to take other ground, which was very fortunate for the patient. More attention would have been paid to the possibility of tuberculosis had not the old pigment been overlooked in the first examination. I feel that this case should be kept under observation for years, as he undoubtedly has a low tuberculous balance and the trouble may re-develop at any time. Just what effect the potassium iodid had on the patient is hard to say, but it is possible it may have been the cause of the redevelopment of the trouble in the second eye, either by loosening up the infection in the eye or some other part of the body. He gave no history of former trouble, so the left eye must have been a spontaneous cure, some time during his life.

*CASE 4.* Entered hospital January 28, 1919; age 26; white; in the service 8/12 years; occupation, farmer; from Texas; father dead from unknown cause; otherwise family history negative; had diseases of childhood, no other illness except fracture of left arm and injury since entering the army; denies any venereal history.

*History.* Entered the hospital with a history of gunshot wound of the lower third of the right thigh, received while in action in France. Wound was practically healed when he reported to me on March 5th. Stated he had no previous trouble with his eyes up to a week ago when he noticed sight of the right eye failing. There had been no pain or redness.

*Examination.* Right eye, vision, 20/200. Thru dilated pupil could be seen a slight spot of white exudate about one-quarter the size of the disc, slightly

up and in from the macula. Left eye, vision 20/20, fundus negative. Routine examination of nose, throat, teeth, genito-urinary tract and Wassermann, negative. Diagnostic doses of old tuberculin were commenced. The first dose of 1 milligramme was followed successively each 48 hours with 3, 5 and 8 milligrammes, a total of 17 milligrammes. With the last dose there was a temperature rise to 99.4, with focal and local reactions. The exudate, which had flattened out to some extent under the use of atropin, to almost the level of the surrounding tissues, again became swollen and a large amount of exudate was thrown out around it, taking on the appearance of cotton. This subsided, in about ten days, to the flat appearing spot it was before the administration of the diagnostic doses. Injection of old tuberculin was commenced with 1/10,000 milligramme, increasing doses. The case passed from under my observation after the second dose was given, owing to my leaving the service, at which time there was no change in the vision.

*Discussion.* I would judge that the development of the condition was due to intensive training, hard work on the fighting line, combined with the lowered resistance produced by the soldier's wound. I would consider the prognosis unfavorable owing to the location of the infected area being so near the macula.

**CASE 5.** Reported at the clinic February 28, 1919; age 25; white; in the service 16/12 years; born in Italy but lives in Texas; occupation, telephone lineman; father, accidentally killed; mother, dead twenty years, cause unknown; one brother killed in France. Said he had never been sick in his life, denies venereal history.

*History.* Stated he could always see well up to September, 1918, when he noticed the vision of his right eye was getting bad. At this time the pupil became dilated and remained more or less so ever since. Shortly after this he was placed in a base hospital, where he was under treatment for about three months, when he was sent to another base hospital for an S. C. D., but was returned to duty. He again entered the first hospital and was then transferred to another

hospital, and then ordered here. During the treatment at the different hospitals he had had his blood tested a number of times and had treatment for his eye, but with no improvement. A transfer slip from the last hospital confirmed his statements.

*Examination.* Right eye, vision 20/70 with plus 1 sphere equals 20/20; with plus 3 sphere added reads 0.75 at 14 in. Pupil larger than normal, reacts very slowly to light and accommodation. Fundus examination disclosed that between the disc and the macula, slightly up, were two light brown patches of chorioiditis with a few spots of pigment at the edge. In the neighborhood of the larger areas were several white small spots of the same character. Left eye, vision 20/20. Routine examinations were all negative.

Diagnostic doses of old tuberculin, 1, 3 and 5 milligrammes each successive 48 hours were given, a total of 9 milligrammes. With the last dose there was a general reaction, temperature going up to 101.4, with a decided local reaction. The focal reaction was slight, but became more pronounced within the next 24 hours, so that there could be no doubt about it. This case was placed on therapeutic doses of old tuberculin, but also passed from under my observation when I left the service, at which time there had been no material change in the conditions.

*Discussion.* In addition to the positive reaction from the diagnostic doses of tuberculin, we had the evidence of the dilated pupil, which is occasionally found in tuberculous individuals, even with no other eye involvement. Just how frequently this occurs I am unable to say. In a personal conversation with the officer in charge of our tuberculous cases, he stated that he had seen it twice in 700 cases that had passed through his hands. It is usually ascribed to an involvement of the sympathetic system, caused by pressure from enlarged glands. The fact that this case, in addition to having the dilated pupil, also had loss of accommodation, would undoubtedly mean that there was partial involvement of the third nerve.

**CASE 6.** Reported at the clinic Feb-

ruary 28, 1919; age 25; white; in the service 2 years; born in Michigan, lives in Chicago; occupation, clerk; father dead from cause unknown; other members of family well; had measles, mumps and scarlet fever in childhood; no other illness; denies venereal disease; facial expression that of one suffering from photophobia.

*History.* States that he has had numerous attacks of photophobia during his life, from which recovered in a few weeks. During the last two years he had been in the hospital 17 weeks, the present being his fifth attack within the last year. An attempt had been made to overcome this condition with tinted glasses, which was not successful.

*Examination.* Right eye, vision 20/100; marked photophobia, with a small opacity in the center of the cornea. Examination of the fundus was difficult owing to the photophobia, but at this time nothing abnormal was found. This was confirmed by a later examination. Left eye, vision 20/50; marked photophobia; cornea clear; fundus negative. Routine examination negative. Diagnostic doses of old tuberculin, 1, 2 and 3 milligrammes each 48 hours were given, total 6 milligrammes. On the last dose there occurred a general, local and a slight focal reaction, sufficiently marked to warrant placing the patient on therapeutic doses. The last given under my direction was 2/10,000 of a milligramme. This patient passed from under my observation owing to my discharge from the army, at which time he had vision in the right eye, 20/50; left eye, 20/20.

*Discussion.* There may be some doubt about this case being one of tuberculosis, as it is not very clear cut. However, all other causes for the condition being negative and the reactions from the diagnostic doses of tuberculin prompt, with a smaller dose than is usually given, leads me to believe that we were possibly dealing with a tuberculo-toxic condition. The corneal opacity was not typical of tuberculosis, but it was a well defined area in a perfectly clear cornea, which is suspicious. On the other hand, the history of the patient shows that there had been spontaneous improvement a number of times without treatment, so

there may have been a mistake in the diagnosis.

*CASE 7.* Reported at hospital February 20, 1919, on a transfer; age 23; white; in the service 7/12 years; from Arizona; occupation, cowboy; diagnosis, chronic tuberculosis, involving upper lobe of both lungs; family history negative for tuberculosis; had whooping cough and measles in childhood; typhoid six years ago, no pneumonia or pleurisy; subject to coughs and colds; denies venereal disease; weight 200 lbs.

*History.* He stated he was born in Arizona, where he had always lived; that he was perfectly well on entering the service on May 1st, at which time he passed his entrance examination. He was in training 33 days when he was sent overseas. He did not remember whether he took an overseas examination or not. He became sick on board ship with something like rheumatism and on landing was placed in a hospital in Liverpool, where he remained in bed next to a man who had hemorrhages. He was in the hospital for three months, losing weight and becoming so weak that he had to be lifted out of bed. He left England in September weighing 150 lbs. On his return to this country he was placed in an army general hospital for the treatment of tuberculosis, since which time he has been under treatment for that disease and has regained his normal weight of 200 lbs.

Regarding the eye, he stated that he had always had good vision until about two months ago, when he noticed he could not see as well with his right eye as formerly, since which time the vision had been growing steadily worse. His brief showed that he had some fine moist rales in the upper parts of both lungs.

*Examination.* Right eye, vision 20/50; conjunctiva red, moist and a general sticky appearance of the lids, but no secretions; pupils normal in size and reaction, but dilated slowly under homatropin; vitreous cloudy, with several large, bright white spots floating in it; on the nasal side of the fundus is a flame shaped white exudate. Left eye, vision 20/20; conjunctiva, same appearance as the right eye; pupil dilated slowly under atropin, no fundus change found.

Routine examination of this case was negative. Owing to his history, no diagnostic dose of tuberculin was given.

On consultation with the surgeon having the case under his care, I was told that the patient had had normal temperature for some time and the activity in his lungs was very slight. It was therefore thought advisable to start with an initial dose of 1/500,000 of a milligramme, from which we had no reaction. The next doses were successively 1/200,000, 1/100,000 and 1/50,000 of a milligramme. Following the dose with 1/50,000 milligramme, the left eye became painful and red.

The pupil was dilated with atropin showing iritis, with two synechia, one of which broke loose under the effect of the drug, the other remaining fastened. In the angle of the anterior chamber in line with this large synechia was a white exudate, taking up about 1/6 of the curve of the cornea, with a rather prominent vessel running across it. Shortly after starting the treatment of the eye, the lung condition was pronounced inactive and the patient was transferred to the eye ward, where I left him on my discharge from the service. The condition of the right eye had improved; the left was apparently stationary. I advised the continued use of small doses of tuberculin.

*Discussion.* I consider this case interesting from the standpoint of general tuberculosis, as well as from the eye. I am well acquainted with the country where this boy was reared and I do not believe there is any section in the United States as free from tuberculosis. There is no doubt in my mind that he either did not develop immunity, or if he did, that it was very slight. It is a doubtful question whether an old lesion became active in the training camp, or, as he thinks, he became infected while in the hospital in England. Wherever it was the action was very rapid, due to his lack of resistance.

I feel positive as to the correct diagnosis of the eye condition. The development in the first eye and its general appearance was typical. The second eye looked normal, but a reaction occurred

with 1/50,000 milligramme of old tuberculin. The large synechia and the exudate in the angle of the anterior chamber were no doubt tubercles undiscovered up to the time of the reaction. The point of saturation of this individual was very low owing to the great number of antibodies developed by the lung condition. Much to my regret I left the service before this case was completed. I believe that the patient should be continued under this treatment for many months and kept under observation for several years.

*CASE 8.* Reported at the clinic March 22, 1919; aged 19; white; in the service 2 years; born in Georgia; occupation, student; family history, father not well, cause unknown; 3 brothers died in infancy; 3 sisters died in infancy. Personal history, had had whooping cough, measles and mumps about age of ten; influenza in September 1918; denies venereal history.

*History.* Had good eyesight up to November 18, 1918, when he noticed, one morning, that there was a cloud before the left eye. The next day it was so bad he could hardly see. He reported to the regimental infirmary in November and was sent to the base hospital where he stayed until the middle of January, 1919, when he was returned to duty with the sight unimproved. During his stay in the hospital they made 8 blood tests and 3 spinal fluid examinations, of which one spinal was reported positive. Treatment while he was in the hospital was anti-syphilitic.

*Examination.* Right eye, vision 20/30; some fine changes in the macula. On the nasal side of the fundus was seen a large white spot of inactive choroiditis. Slightly up and in from this was another spot of similar character. Between the two, connecting them, ran a line of white exudate over the retinal vessels, similar to retinitis proliferans. Over the vessels of the nerve was some fine, white exudate, very indistinct. He was not aware of ever having trouble with this eye. Left eye, vision 10/200. On the temporal side of the fundus was a large white, elevated spot of choroiditis, apparently inactive, fairly well covered with exudate. In the neighborhood of



this were many small light brown spots. The nerve showed a white exudate, quite marked in character; vitreous opacities numerous, but not enough to interfere with a good view. Routine examination was negative. Diagnostic doses of old tuberculin, 1, 3, 5 and 8, a total of 17 milligrammes, were given with no reaction. Acting on my advice, another dose of 8 milligrammes was given the day I left the service, of the result of which I am not aware.

*Discussion.* From the general appearance of this case I believe that we are dealing with an obsolescent, inactive tuberculosis, and that it would take a large amount of tuberculin to bring the patient up to a stage of saturation sufficient to get a reaction. Even should the diagnosis be made, I consider that there is very little hope of improvement in the left eye. However, it is possible that thru its use we can develop sufficient immunity to prevent a recurrence of the trouble in the right eye. I strongly advised continuing this patient under observation and investigation for a long time.

#### CONCLUSIONS.

1. According to modern teaching practically every individual has been infected with tuberculosis some time in his life. This infection is overcome by a passive immunity which may last until it is disturbed by excessive physical exercise, mental strain or disease, at which time there may be a relighting up of old infected areas.

2. The age from which the recent army was selected, the military training, the mental strain and other conditions were such as to be conducive to the re-development of any latent tuberculous foci.

3. Should these conditions be found among the soldiers, treatment should be directed along the same line as that followed in civil practice.

4. Owing to the limited amount of treatment it was possible to give cases of this character, relapses are possible and should be carefully looked for, and the same line of treatment continued in civil life.

### PRACTICAL CONSIDERATIONS IN CONNECTION WITH INSUFFICIENCY OF CONVERGENCE OF THE VISUAL AXES.

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This paper reviews the causes, symptoms and diagnosis of convergence insufficiency, and advocates its systematic treatment, by correction of ametropia, systematic exercises and operation to shorten or tuck the relaxed tendon. Read before the American Academy of Ophthalmology and Oto-Laryngology, October 17th, 1919.

By the term "insufficiency of convergence" is meant in this paper insufficient action of the adductor muscles of the eyes in securing and maintaining with ease the necessary degree of convergence of the visual axes in the coordinated muscular action required to secure single vision for points within infinity. A sharp distinction must be drawn between convergence insufficiency, in which single vision is possible under effort, up to a very finite distance from the eyes, and external strabismus in which a fixed angle of divergence exists between the visual axes, which renders single vision im-

possible whether at finite points, or at infinity. Conditions of paresis are eliminated from this discussion.

Admitting then the existence of convergence insufficiency, as a pathologic entity affecting the visual apparatus, what is the essential nature of such condition? The adductor muscles, the ciliary muscles, and the sphincter pupillae are supplied with innervation thru the third nerve, the ciliary muscle and sphincter pupillae being supplied by this nerve thru the ophthalmic ganglion.

The nucleus of origin of the third nerve is situated in the floor of the

fourth ventricle beneath the aqueduct of Sylvius. This nucleus, there being one on each side of the median line for its corresponding nerve, is a collection of ganglionic cells, from which the bundles of fibers, constituting the third nerve, proceed to the ocular muscles. Fibers ascend, also, from this nucleus to the angular gyrus of the cerebral cortex, which is supposed to contain the centers for the voluntary associated movements of the eyeballs (Bernheimer, Fuchs). Thru a higher center, not yet located, but which is thought to be in the angular gyrus, it is generally assumed that the convergence of the two eyes is so coordinated as to secure single vision for points within infinity.

Convergence is also associated with accommodation, both functions being, as before noted, under the direct control of ganglion cells in the nucleus of origin of the third nerves, and coordinated by the action of a higher center, or centers.

This relation of convergence and accommodation was forcibly dwelt upon by Donders many, many years ago in advancing his views concerning the cause of internal strabismus, and is familiar to every oculist. Any condition which may have the effect of altering this relation between convergence and accommodation, as uncorrected errors of refraction, for instance, may be sufficient to induce convergence insufficiency.

Landolt estimates that there must be in reserve for work at any given finite point, twice as much power of convergence as that required for securing single vision at that point, a fact which must be borne in mind in estimating the amount of convergence necessary for our patients.

**CAUSES OF INSUFFICIENCY OF CONVERGENCE.** The following are considered possible causes of this condition by various observers:

1. It may be caused by a lesion of the brain or spinal cord, (Landolt).

2. It may be a result of the neurones. Neurasthenia may be particularly responsible. (Landolt).

3. Anemia, or some debilitating disease, may be the cause, (Landolt).

4. A real weakness of the internal recti muscles of congenital origin may be responsible, (De Schweinitz, Landolt).

5. Errors of refraction and disturbance of accommodative efforts may induce the condition, (Landolt, De Schweinitz, and many other observers).

6. Faulty attachment of the muscles, (De Schweinitz).

7. Excessive action or spasm of opposing and dominating muscles, (De Schweinitz).

8. Disturbances of innervation, (Gould, De Schweinitz, Tscherning, Hansen Grut).

While all of these assigned causes may play a more or less important part in inducing convergence insufficiency, the most important factors are now considered by most observers to be those connected with the innervation of the muscles connected with the function of convergence.

Hansen Grut and Tscherning attribute this insufficient convergence *not to absolute weakness* of the internal recti muscles, for if this were so, the associated muscular movements of the ocular muscles in other functions, would be interfered with, but to *defective innervation*. Tscherning says in his Physiologic Optics, "It is not in the muscles; it is in the innervation of convergence that we must seek for the cause of the deviation".

**SYMPTOMS:** The symptoms enumerated here have been formulated from my own experience. Marked ocular and mental fatigue, after short use of the eyes in near work, is generally the first symptom. The print may become dim, and the letters overlap each other, or become mixed. Upon looking at the hands of the watch, or the marks on the dial, they may seem to broaden and then regain their normal width, and then to broaden and broaden again, showing a tendency to diplopia. As the condition becomes more established, increasing efforts of convergence will be necessary to avoid double vision, and after using the eyes for a short while in near-work, a feeling of intense nervousness in the spine be-

tween the shoulder blades may manifest itself, with an impulse to throw away the book or paper under observation.

In walking, the ground at the patient's feet may seem to oscillate and giddiness may result, and a similar oscillation may be noted in looking at objects around the room when indoors. Headaches may be frequent, at times resembling migraine. Nausea and dizziness may result from close use of the eyes. In locomotion the patient may feel as though he were going to fall forward or to either side. Tender spots frequently make their appearance along the spine in the cervical and dorsal regions, and paresthesia may manifest itself in the form of burning spots, or areas, on the arms and forearms, or along the spine. A feeling of fatigue and drawing just back of the mastoids is frequently complained of.

Very often in consequence of these nervous manifestations, the fear of organic disease may be induced in the minds, both of patient and attending physician. Great mental depression and hypochondriasis are prone to come on, and add to the troubles of the patient, until finally the victim may pass into a condition of almost confirmed invalidism.

These nervous symptoms are due to the great "nerve leakage," if I may be permitted to use such an expression, resulting from the never-ceasing spurring on of the flagging convergence, to avoid diplopia, and will disappear upon the correction of the convergence insufficiency.

Finally, in extreme cases, the positive convergence may be so weakened as to render single vision impossible for points within a useful working distance for any length of time.

DIAGNOSIS: 1. Cover test. The use of this well known test for both distance and the near point will serve at least to create a suspicion of convergence insufficiency in the mind of the examiner.

2. Examination to determine the *existence, or nonexistence of heterophoria*.

With the test object, a candle flame or point of electric light, at twenty feet the use of the phorometer, or Maddox rod, will serve to detect a condition of

heterophoria. In a case of convergence insufficiency, we may find perfect orthophoria, or there may be some degree of exophoria, or even of *apparent esophoria*. An exophoria would not be surprising from the nature of the condition, an orthophoria would show, of course, the possibility of maintaining a parallelism of the visual axes, but what would be the significance of an *esophoria*, which would seemingly be entirely out of place in a case of weakness of convergence?

This occurrence of esophoria for distance in unmistakable cases of convergence insufficiency for near need throw no one off his guard. The esophoria is *apparent*, not *real*, the convergence insufficiency being the *key of the condition*. My colleague, Dr. H. B. Lemere, and I have explained this seemingly anomalous condition, as follows: In the constant effort to maintain sufficient convergence to avoid heteronymous diplopia for the near point, a partially spastic condition of the internal recti muscles is induced, which would account for this seeming esophoria for distance. We do not consider that this spurious esophoria should be a bar to efforts to increase the positive convergence in the condition under discussion. It is a result of the insufficiency of convergence, not a definite, real state of muscle imbalance. Consequently, in our efforts to correct the insufficiency of convergence in any case, whether by prism exercises or by operative procedures, we ignore such apparent esophoria, and find invariably that it disappears after the positive convergence has been brought up to the degree required.

This matter has been fully discussed by my colleague, Dr. H. B. Lemere, in a paper entitled, "Apparent Esophoria and Its Relation to Convergence Insufficiency", read before the section on Ophthalmology of the American Medical Association at the Minneapolis meeting in June, 1913, to which paper I beg leave to direct attention.

3. The determination of the *punctum proximum of convergence*.

It need not be expected that the power of convergence of the visual axes may be

determined with any degree of accuracy by the use of adductive prisms, with the test object at 20 feet. I am well aware that many ophthalmologists, whom we consider as authorities, have held that healthy eyes should show upon demand a prism convergence for distance of 30°, or 35° to 50°, and that persons who cannot do this have convergence weakness. I must disagree with this dictum. Healthy eyes after training with prisms may no doubt attain this degree of adduction, but not at the first office examination in advance of such training. In 1897 I conducted a series of experiments upon the subject of the dynamics of the ocular muscles, making use of 100 healthy young soldiers of the regular army, who were in perfect physical condition, and who had never had a symptom referable to their eyes. Only one of these healthy young men was able to exhibit a prism convergence of 26°, the highest degree reached, the average prism adduction being 14.1°.

My findings upon the physiologic action of the ocular muscles determined at that time were presented in a paper entitled, "A Contribution to the Study of the Dynamics of the Ocular Muscles", and published in the *Annals of Ophthalmology*, January, 1898.

Among my conclusions formulated in this paper, was the following: "That the determination of the punctum proximum of convergence, and the calculation of the maximum convergence, after the method of Landolt, are the only true tests of the real power of convergence, or the positive convergence". My findings were afterwards confirmed by Flavel B. Tiffany of Kansas City, who repeated my experiments, by Lucien Howe of Buffalo, and by Hansell and Reber of Philadelphia, as can be seen by consulting the published works of these observers.

I have never changed my views since the publication of the paper referred to.

The determination of the punctum proximum of convergence is very simple, and requires no more complicated apparatus than the well known dot and line on a card, and a rule to measure the distance from the corneae, at which double vision

results when the card is made to approach the eyes. Of course, in such a meeting as this, I need not explain further than to state what every oculist knows, that this distance from the corneae when divided into 100 cm. where expressed in centimetres, or into 40 inches when recorded in inches, will give the power of convergence in *metre angles*.

Now we come to a very practical question; how much convergence should a given individual have in order that near vision may be maintained with comfort?

Schuurman and Duane hold that the normal individual should see an object (as the dot) singly up to 2½ inches from the corneae, which would be equivalent to a maximum convergence of 18.8 metre angles. Landolt, in his great work, "The Refraction and Accommodation of the Eye", places the necessary maximum of convergence at 9.5 metre angles. I am of the opinion that the exigencies and serious demand upon the eyes of our strenuous American life, require a higher degree of convergence than that given by Landolt, while a lesser amount than the 18.8 metre angles advised by Schuurman and Duane would seem to be sufficient. In my experience 13 metre angles of positive convergence will furnish sufficient power of convergence to secure thoroughly comfortable use of the eyes in near work, and I have made this the standard in my practice. This would mean, of course, that the patient should see the test object singly at three inches from the eyes.

#### 4. *The determination of the punctum remotum of convergence, or the negative convergence.*

After determining the maximum of convergence in a given case, and finding it so defective as to constitute a convergence insufficiency, the negative convergence, or power of abduction should be enquired into in order that the examiner may form an estimate of what part a possible over-action of the external recti muscles may be playing. Abductive prisms furnish a ready means for determining this point. All oculists know from experience that prism abduction unlike prism adduction, remains quite constant in healthy eyes, and cannot be



appreciably increased by exercises with adductive prisms.

In my published experiments, the average prism abduction for distance in my 100 cases was  $6.88^\circ$ , or  $7^\circ$  virtually. The standard of  $7^\circ$  for healthy abduction has been generally accepted by the profession. To find the negative convergence in metre angles, divide the prism abduction by 7 as it is well known that 1 metre angle corresponds to  $7^\circ$  (prism).

If in a case of positive convergence much below the standard the negative convergence (abduction) should amount to 2 or 3 metre angles, one may suspect an over-action of the external recti muscles as complicating the case.

TREATMENT: (a) Any existing ametropia must be accurately corrected by lenses, and the patient be required to wear his correction constantly as an essential to success. In myopic conditions, showing moderate degrees of convergence insufficiency, this may relieve the trouble, but in marked degrees of the affection under discussion, whether in myopic or hypermetropic states, other treatment will be required as a rule. I consider prisms, bases in, combined with the ametropic correction contraindicated, and have not prescribed them for many years. The reasons for this are obvious.

(b) Training with adductive prisms and other exercises. Systematic training with adductive prisms of gradually increasing strengths, after the method of Gould of Philadelphia, may prove efficient in moderate types of convergence insufficiency.

The methods of training the adduction advocated by Worth are also highly beneficial as adjuvants in certain cases. Worth's amblyoscope I have at times found of service as a means of stimulating the fusion impulse and thus improving the innervation of the adductive muscles.

These methods may be satisfactory in instances where the maximum of convergence does not fall below  $6\frac{1}{2}$  metre angles.

(c) Treatment by operative methods.

Where the maximum of convergence is decidedly low, say about 5 or 6 metre angles, especially if the negative convergence is comparatively high, operation

will be indicated in the presence of marked nervous symptoms. Under such conditions, operation should be undertaken even if there should be an apparent esophoria.

I am a firm believer in the value of the views of Landolt, enunciated many years ago, that in cases of insufficiency of convergence requiring operation, our operative methods should primarily be of the nature of an advancement of the internal rectus rather than a tenotomy of the antagonist. It will rarely be the case that a tenotomy of the antagonist will be advisable, and then only when the negative convergence is markedly increased. Some form of advancement being determined upon in a given case, what should be our method of procedure? I am an ardent advocate of securing the effects of an advancement by *shortening* the tendon by the use of a *tuck*. I have been performing this operation since 1898, and have never made use of the technical advancement operation for this purpose. The tuck operation was suggested by Dr. Savage in 1893.

The "tuck operation" which in my hands has proved eminently satisfactory, is the operation brought forward by Dr. Francis Valk of New York in 1897, with certain modifications. In this operation, the tuck is made with a single mattress suture of "0" or "00" chromicized catgut, and left buried, the flap of Tenon's capsule and conjunctiva being united over it by silk sutures, two generally being sufficient.

In performing this operation, I have found attention to the following points essential, viz.: (a) The careful freeing of the tendon from Tenon's capsule, and separation of the belly of the muscle from the globe back to a point beyond the base of the mattress suture, in order that the tendon may be permitted to slide forward when the suture is drawn taut to make the "tuck".

(b) The passage of the ends of the suture thru the upper and lower thirds respectively of the attachment of the tendon to the sclerotic embracing the dense episcleral tissue just at the tendon insertion, and the securing of a strong hold upon the belly of the muscle at the situation of the base of the mattress

suture by weaving the suture in and out as it is passed through the muscle. These steps are necessary in order that the muscle included in the base of the suture may be brought sharply against the attachment to the sclerotic, and held there without slipping.

In my experience, in a great many cases, a tuck so placed has invariably held. These are modifications of the original operation suggested by practical experience at the operating table.

Another modification, which has been utilized by my colleague, Dr. H. B. Lemerre, and myself, is the following, which we have found very useful: In case after drawing taut and tying the mattress suture, an insufficient effect has been obtained, an additional effect may be secured by rethreading the needle upon one end of the suture, which has been left uncut, and passing the needle farther back thru the belly of the muscle, and then tying to the other end of the suture left in situ. This makes a supplemental tuck, which, in our experience, has always held firmly. The "hump" in the muscle resulting from the tuck atrophies in a very short while, and the tendon remains shortened in proportion to the amount of the muscle embraced in the mattress suture. This method has decided advantages over the usual technical advancement with a separation of the muscle from its attachment to the globe, and with a reattachment by silk sutures at a point nearer the cornea, for in the first place there are no sutures to possibly cut thru the ocular tissues, with a resulting slipping back of the tendon and loss of effect; in the second, the effect can be more accurately gauged, and if not sufficient the accessory tuck can be utilized, and thirdly, since an absorbable material is used to make the tuck, there are no deep sutures to be removed afterwards.

This operation, performed on one eye with the proper amount of muscle incorporated in the tuck, will in the great majority of cases be all that will be required. In very rare instances, with a strongly over-acting external rectus, and a markedly increased negative convergence, the greatest effect to be secured by tucking one internal rectus may not be

sufficient. Then after a short interval of ten days or two weeks, a similar operation may be performed on the internal rectus of the other eye, and the full effect required be thus secured. In extreme cases it may be necessary to also perform a tenotomy of the antagonist, as before noted. Such cases as the latter are desperate, and the patients will gladly submit to additional operative measures in the hope of getting relief. Local anesthesia, except in the case of very young, nervous individuals, is, of course, indicated. In addition to the instillation of cocaine in the conjunctival sac, I make use of a subconjunctival injection of a 1% solution of novocain around the tendon and belly of the muscle.

*Conclusions:* The views advanced in this paper may be formulated in the following conclusions:

1. That convergence insufficiency of the type discussed in this paper is a definite pathologic entity.
2. That this state is due to lack of proper innervation of the adductor muscles, which innervation is under the control of a special cerebral center.
3. That the use of adductive prisms can not be relied upon to furnish an estimate of the power of convergence in any given case.
4. That the power of convergence must be determined by finding the punctum proximum of convergence, and estimating the maximum convergence in meter angles.
5. That the negative convergence should be determined by abductive prisms as furnishing an important indication of a possible over-action of the external recti muscles, the normal negative convergence being about 1 meter angle.
6. That the normal maximum of convergence may be placed at about 13 meter angles, and that any marked falling below this standard is positive evidence of the existence of convergence insufficiency.
7. That if the maximum of convergence does not fall below  $6\frac{1}{2}$  meter angles, exercises with adductive prisms, and other exercises, to strengthen the adduction may affect a cure of the convergence insufficiency thru stimulation of the innervation.

8. That if the maximum of convergence is as low as 5 meter angles, operation will be necessary as a rule.

9. That the existence of an apparent esophoria, in the presence of a definite convergence insufficiency, is no bar to efforts to correct the latter either by exercises or by operation, as the conver-

gence insufficiency is the key of the condition.

10. That operative measures should be of the nature of an advancement, or shortening of the internal rectus muscle, rather than a tenotomy of the antagonist, the latter expedient being reserved for rare and very extreme cases.

## PRELIMINARY REPORT ON SUBCONJUNCTIVAL CATARACT OPERATIONS.

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Becoming interested in the operative method described by Husain of India, the author has taken it up and here reports the technic of his method of operating and the results obtain in 17 cases by himself and colleagues. Read before the Ophthalmologic Section of the Maine Medical Society, Nov. 14, 1919.

In December, 1918 the writer received from Dr. Tasadduk Husain, Ophthalmic Surgeon, Eye Hospital, Alahabad, India, a reprint describing an operation for cataract in which the section is wholly covered by conjunctiva after extraction is completed. Dr. Husain writes, "the chief advantage of this operation is the quick healing of the wound. Exogenous infection can occur only so long as the wound is unhealed and this period in this operation is so short, that the preliminary mechanical cleansing (done before the operation) the presence of collargol (dropped after the operation), the lower level, and the distant situation of the wound in the conjunctiva, are sufficient to prevent infection from traveling up a long way to the interior of the eye ball during the short time that the flap takes to adhere. In virtue of this quality, suppurations are reduced to 0.4 per cent in ordinary cases of cataract".

Dr. Husain recognizes Czermak's and Hari Shanker's work done in the same field, as follows: "My extraction is subconjunctival with a large conjunctival pocket-flap, so that I have taken advantage of the attempts of Czermak and Hari Shanker to produce quick healing of the wound. Thus, I do not claim to give you entirely a new operation, but my method of procedure is different from all these great operators on cataract. The modifications are novel and my own, and make the operation a distinctive one, and I

claim, that for a particular class of cases, it is the most suitable and rational procedure, and the only possible operation".

The instruments used by the writer were the usual ones with a keratome and thin, angled, blunt pointed iris scissors instead of a cataract knife, and some form of anterior chamber irrigator. The usual preparations were made, the operator being careful to flush the conjunctival surfaces thoroly with boric acid solution just before the operation. Cocain was used as usual.

A small opening was made in the conjunctiva, about one cm. above the sclerocorneal margin (the patient looking down) and this enlarged from each side horizontally to 1½ cm. in length, keeping the line of incision equi-distant from the sclerocorneal margin. Thru this opening the subconjunctival tissue was cut to the limbus. Then, with the scissors closed and with lateral movements, pockets were made on each side of the central subconjunctival tunnel. At this point in the operation there may be considerable hemorrhage. Gentle sponging with tooth pick cottoned swabs will control this. The flap or lower margin of the incised conjunctiva was lifted with forceps and with the angular keratome a puncture was made into the anterior chamber at the sclerocorneal junction, care being taken not to injure the capsule. The point of puncture is easily seen if kept clean by one's assistant. It is well

to go in as far as possible with the keratome, making less cutting with the scissors necessary.

The conjunctival flap was still held with forceps in the left hand. Then thru the incision made by the keratome, one blunt blade of the scissors was passed into the anterior chamber, above and along the plane of the iris and the sclero-corneal junction cut, first on one side, then on the other side of the keratome wound, thus lengthening it to allow for the delivery of the lens. If the subconjunctival pockets on each side have been made large enough there will be no difficulty in passing the scissors. The writer has found artificial illumination almost imperative while using the keratome and scissors. Buckling is apt to

occur if the scissors are not very sharp and well made.

With the assistant holding the flap, iridectomy, capsulotomy and delivery may be performed without difficulty. If, before or after delivery, blood collects in the anterior chamber it should be at once washed out (the irrigator should always be at hand), as it coagulates very quickly. After delivery the writer has always irrigated in the effort to remove any transparent cortical present. Reposition of the coloboma was easily done with the flap held up and forward. The conjunctival flap was carefully smoothed back, approximating the cut edges as well as possible and one stitch taken centrally. This was removed on the third or fourth day.

TABLE OF CASES.

Case	Age	Admission Vision	In Hospital	Discharge Vision
1	74	V. O. D. light perception	10 days	V. O. D. 20/200 (capsule)
2	71	V. O. D. fingers at 6 feet	9 days	V. O. D. 20/40
	71	V. O. S. fingers at 1 foot	10 days	V. O. D. 20/40
3	65	V. O. D. light perception	9 days	V. O. D. 20/100 (capsule)
4	64	V. O. S. light perception	8 days	V. O. S. 20/200 capsule)
5	65	V. O. D. light perception	10 days	V. O. D. fingers at 2 feet (cortical)
6	52	V. O. D. light perception	11 days	V. O. D. 20/200 (capsule)
7	75	V. O. S. light perception	14 days	V. O. S. 20/70
8	60	V. O. S. 20/70	17 days	V. O. S. 20/30 (final test)
9	60	V. O. D. fingers at 8 feet	10 days	V. O. D. fingers at 1 foot (capsule)
10	69	V. O. D. fingers at 10 feet	10 days	V. O. D. 5/200 (capsule)
11	82	V. O. D. light perception	5 days	V. O. D. 20/30 (final test)
12	80	V. O. D. 20/70	6 days	V. O. D. 20/30 (final test)
13	73	V. O. S. light perception	14 days	V. O. S. 20/200
14	59	V. O. S. 20/100	6 days	23 days later V. O. S. 20/30 V. O. S. 20/70
15	35	V. O. S. 10/200	8 days	3 weeks later V. O. S. 20/30 V. O. S. 20/30 (final test)
16	66	V. O. S. 4/200	8 days	V. O. S. 20/30 (final test)
17	74	V. O. S. 10/200	21 days	V. O. S. 20/100



A drop of atropin and some good ointment, like White's, was used in the eye and a double bandage. After six or eight hours the bandage was removed from the unoperated eye, leaving the operated eye bandaged. The writer feels that many cases of dementia may be obviated by giving the patient one eye.

In the subconjunctival operation for cataract there is no danger of the wound opening a few hours after operation. Husain found that the average time of patients in the hospital was 4.84 days. The writer found about six days hospital care necessary.

The conjunctiva remains injected for several weeks after the operation, but does no harm otherwise. Striped keratitis is more often present, but the writer has not seen it persist.

One of the writer's confreres reported late hemorrhage into the anterior chamber, which absorbed without doing any harm; and in two cases there was delayed healing of the sclerocorneal wound with ballooning of the conjunctiva like the bleb after Elliot's trephining operation. This flattened out without doing any harm.

It takes longer to do the operation, but the writer has no difficulty, nor have

his confreres. Husain reports no trouble but says that prolapse of the iris "fortunately of very rare occurrence" is difficult to deal with.

The writer did not attempt this subconjunctival method of extraction until the end of his spring hospital service. The results were so satisfactory that he persuaded several of his confreres to try this method of extraction.

Many of the cases listed in the following table are to return for secondary operations but the private cases are completed.

It has always seemed to the writer that this danger of infection could be minimized by some sort of conjunctival flap, which would entirely cover the wound. The usual flap with the knife leaves the extremities of the incision exposed. The bridge operation leaves one end somewhat exposed and the bridge is awkward to manipulate. In this operation the danger of infection and the attending worry are almost dissipated.

In conclusion the writer wishes to thank his confreres Dr. Standish, Dr. Greenwood and Dr. Ellis, for their courtesy in allowing him to report their results, with his, in this operation.

### PROPER TIME FOR OPERATION ON CONGENITAL CATARACT.

M. HAYWARD POST, JR., M.D.,

ST. LOUIS, MO.

The report of a case of this character is the occasion for a discussion of the proper time for operating; and early operation is urged, preferably about the eighth year.

The question whether congenital cataract should be operated on early in life, say roughly before the tenth year, presented itself forcibly to my consideration for the first time about four years ago. On the third of April, 1915, Miss D. came to my office for an opinion as to the advisability of an operation for the removal of bilateral congenital cataract. Thirteen years before she had been seen by Dr. Post, Sr., at which time she was ten years of age. The record shows, and her statement bore out the fact, that by holding books close to her right eye she was

able to read. The note stated that with correction O. D. V 3/30 O. S. V 3/150 and Jager No. 10, with difficulty. For some reason unknown, the operation was postponed for a short time.

The patient regretted that she was late in returning, but reported that she had been able to do sufficient work to go thru the freshman year in the State University with her eyes in their present condition.

The questions now arose: first, was it too late to operate and find the retina in good condition; second, if degeneration were present was it possible that

it could have been avoided by earlier operation; and thirdly, had Dr. Post deferred operation because he did not believe that even at that time it was justified and did not wish to discourage the patient by a statement to that effect, as was so often his way? With these questions unanswered but feeling that there was nothing to be lost by operation on the left eye, which was the poorer one, the patient greatly desiring it, and the cataract slowly enlarging, operation was advised on that eye.

On April twenty-third, with a very sharp sickle needle the lens was incised by a single horizontal incision about two and a half millimeters long. The capsule was very tough so that there was some difficulty in the operation.

The case progressed quietly and without complications. On September third, four and a half months after the operation, the pupil was clearing from above and to the temporal side, and with 7.00 D. sph., a good view of the disc was obtained thru this region. On December second, seven months after the operation, there was a good clear central pupil thru which the fundus could be well seen with 8.00 D. sph. No abnormalities were noted. At this time the ophthalmometer showed an astigmatism of 2.00 D. vert. Mer. Vision seemed, however, to be eccentric and patient could not read even large print. The last observation taken in May, 1916, shows no further improvement and a partial central scotoma which probably accounts for the extremely unsatisfactory result.

Until the time of the last examination the patient was very anxious to have the second eye operated upon. But, in view of the result of the first operation, is an operation on the right eye justifiable? What harm, if any, would result from waiting perhaps three years to see whether or not the left eye improved?

My interest was naturally greatly aroused and I began to review the literature as to the result of late operation on such cases and to compare them with those of earlier operation.

It was surprising to find how little interest the question had aroused, at least to judge by the small amount of literature dealing with it. There is very great diversity of opinion, but as a general rule the majority of writers hold that the dangers from amblyopia ex anopsia are greater in proportion to the amount of lens involved and the consequent impairment of the function of the retina. In the case of diffuse cataract all agree that early operation is imperative, but the opinion is not so unanimous with regard to those of lesser degree.

The other argument in favor of early operation is that complete absorption of the lens substance and capsule is much more likely and rapid in young cases and that more radical measures, such as linear extraction, are less likely to be necessary either because of the production of glaucoma or failure of the lens and capsule to absorb.

Fuchs demands operation during the first year of life. He says, "Cataracts which are congenital or develop in childhood should be operated on as early as possible at the age of a few weeks. If the cataract is not operated on the development of the retina is arrested and amblyopia ex anopsia is produced."

On the other hand, Grod, reporting on the statistics of cases operated on by Hess and Hirschel at Würzburg during fifteen years, shows that early operation causes an arrest of growth of the eye and that useful vision is obtained in a higher percentage of the cases operated on later than in those of earlier years. In summary he expressed himself in favor of a late rather than an early operation.

J. E. Brown reporting on sixty-six cases in the Ohio State School for the Blind does not gather that the age of the patient at the time of operation influences the final result, his cases ranging from childhood up to middle life.

No opinion could be found expressed in the American Encyclopedia of Ophthalmology, so far as published, on the question as to the relation of age to the final result. But as a plea for early

operation, I should like to quote the following from its pages:

"Discission in any of its simple forms is the safest if the most lengthy procedure for the treatment of all states of juvenile cataract before, say the age of ten. When the patient is older, say from ten to thirty, discission alone or combined with suction or the removal of the discission masses thru a corneal opening may be done in cases where there is no reason to suspect a hard nucleus." Still later, say after thirty years of age, any of the operations for the extraction of cataract may be done."

Henry R. Swanzy says, "Treatment is more satisfactory if undertaken early in life by discission and absorption than if later in life when extraction must be resorted to." Discission he further states, is applicable to all complete cataracts up to the twenty-fifth year of age.

That amblyopia ex anopsia may develop from congenital corneal opacities, and congenital cataract is the statement of de Schweinitz in his text book of ophthalmology. Fuchs is in agreement with de Schweinitz in this regard. He further says, "Treatment consists in the earliest possible removal of the obstacle to vision. This will hold good particularly for the cataract of childhood, the performance of which was formerly as a matter of choice put off until the age of puberty, altho we may operate upon cataract (by discission) in childhood even at the age of a few months with the best results." And further, "Exercising of the amblyopic eye is of service in bringing up the functional power of the retina."

With the exception of the report from the Würzburg clinic and Brown in Ohio, these reports all indicate that early operation is advisable in congenital cataract, and that the penalty of too lengthy postponement is degeneration of the retina with loss of function, but that this function may in part be restored by exercise and in this way the disadvantages of late operation may be partially overcome.

The case which I have above related from my own experience would stand

in support of this view. It is only an isolated case and as such of little value except as illustrating the fact that such inactivity may result in complete or partial loss of function.

Two further arguments for early operation, one illustrated by the subsequent history of the case here presented should be taken into consideration. I have been forcibly impressed with the fact that the mental anxiety developed by the patient waiting thru the number of years during adolescence, thinking and reasoning and often studying over her chances of success in an operation that is to mean so much for her whole future, influences the prognosis very much to its detriment. The child of ten does not worry and brood over the situation, she is not so introspective nor does she realize her condition. She puts all her trust into the hands of her parents and lets them do the worrying, which does not materially interfere with a successful outcome. But the young man or woman of twenty years of age has frequently gotten hold of medical or semimedical literature and made a considerable study of the subject and if at all neurotic has greatly magnified the dangers and finally come to the operation as to a great and desperate gamble with their entire future at stake. Their nerves may stand the strain of the actual procedure but the break-down all too frequently follows. The patient under discussion was operated upon for the right cataract two years after the first at her own earnest solicitation with the result that following the operation she became hysterical and unmanageable. Three weeks later while the eye was slowly clearing up, still remaining somewhat irritated, it was thought that returning to her home in the country to be watched by the family physician might improve her mental condition. But within a few weeks' time she returned to the city with a well developed glaucoma which no measures were able to relieve, and the vision of the eye was lost.

The second additional consideration is the mental development of the patient. These cases are not infrequently

rather abnormal children in other respects and should be given as much help as possible during the formative period. The general improvement, both physical and mental, in children where the operation has been resorted to about the tenth year in life has been truly remarkable. A case which I have at present under my care illustrates this point. The first operation was done upon the left eye about three years ago at the age of ten, at which time the patient was very inferior mentally, with about the development of a child of three. Since then she has been enabled, for the first time, to at-

tend school and will take her place in the near future with normal children to grow up as one of them. A consideration not to be overlooked.

Therefore, in conclusion I believe that operation should be undertaken as early as practicable after the eyes have had the greater part of their growth, preferably about the eighth year, in order to lessen the possibility of retinal deterioration, to facilitate the operative procedure, to reduce to a minimum the danger due to anxiety neurosis, and to assist the child to grow up under as nearly normal conditions as possible.

### ADVENTITIOUS HYALOID MEMBRANE FOLLOWING OPERATION FOR SECONDARY CATARACT.

S. LEWIS ZIEGLER, M.D.,

PHILADELPHIA.

After cataract extraction vision may remain impaired out of proportion to the pupillary membrane, and in spite of operation. This paper gives an explanation of such cases, and reports one as an illustration. Read before the Section of Ophthalmology of the A. M. A., June, 1919.

In my monograph on the "History of Iridotomy" presented before this section at Chicago, in 1908, I called attention to my method of V-shaped incision as practiced in two classes of cases, (1) those with heavy iritic membrane and (2) those of more delicate secondary capsular cataract. Today I wish to call attention to an almost intangible filmlike membrane that may form over the vitreous surface after either of the operations named for secondary cataract and which requires similar treatment. This condition I have chosen to designate as "adventitious hyaloid membrane."

#### SYMPTOMATOLOGY

The symptoms are both objective and subjective. Objectively, oblique illumination shows a *faint iridescent sheen* covering the whole surface of the vitreous body as exposed in the artificial pupil, while direct illumination reveals perfect and permanent transparency of the cornea and vitreous media.

The patient's subjective symptoms are usually those of a distant vision of

from 20/30 to 20/50, but a reduced reading vision of from J-6 to J-12. The patient, therefore, grumbles because his good street vision is not accompanied by a correspondingly good reading vision, while the physician either blames a poor adjustment of glasses or charges stupidity on the part of the patient. This condition may appear in a week or two following the secondary operation, or may not occur until several years later, when the patient notices a sudden reduction in the ability to read, while the oculist finds it impossible to improve the near vision by refraction.

#### ETIOLOGY

While no definite pathogenesis can be demonstrated in these cases, it is nevertheless my belief that the mildly corrosive action of a chemically perverted aqueous secretion is responsible for the formation of this filmy opalescent membrane. There is seldom any evidence of inflammatory reaction, altho in one or two cases I have noted the presence of slight ciliary con-



gestion. As a rule, however, there has been an entire absence of disturbing factors, which fact has made the visual diminution the more disappointing. In the single case cited herewith there had been a history of iritis with plastic deposit on the lens capsule some twenty-five years before, and the possibility of some absorption of irritating lymph secretion from a marked acneous eruption on the nose. This, however, is a complication that is most unusual.

#### TREATMENT

There is only one thing to do in these cases, and that is to operate by the method of V-shaped capsulotomy, which should be performed *pro forma* by going thru all the manipulations in a classical way just as tho a heavy capsule were present. If one maintains a good oblique illumination of short focus one will note a wrinkling of the membrane as it presses before the knife, which will be pleasing to the operator because it will demonstrate to him that he has a real pathologic entity to deal with. One will often be surprised at the end of a week to ascertain by refraction that altho the distant vision has improved but slightly, the corrected near vision will now register J-1.

#### REPORT OF CASE

**HISTORY.** Capt. T. F. I., aged 56, of Summerville, S. C., consulted me, Nov. 12, 1918, suffering from occlusion of the pupil in the right eye following cataract extraction performed in Charleston, Sept. 23, 1918. The eye was still red and irritable as a result of an infection which occurred two days after operation, and cleared slowly, leaving the pupil occluded and drawn upward. The tension appeared to be slightly below normal. I advised plus galvanism to drive out the congestion and prepare the eye for operation, which result was secured in about ten days.

The patient had suffered from an attack of iritis in both eyes twenty-five years before, which left capsular deposits in the pupils of both eyes. The pupil of the left eye showed seclusio

pupillae, with the lens more or less opaque in the exposed area. The tension was normal and iris color the same. The vision was: right eye, 1/200; left eye, 3/200. There was present lacrimal obstruction in both eyes and a marked acneous eruption covering the nasal epidermis.

November 22, I performed a V-shaped iridotomy with my knife-needle, entering the anterior chamber above and making two free incisions in the iridocapsular membrane, from below upward. The first iritic puncture caused pain, the second did not. There was slight hemorrhage from a patch of plastic deposit at the edge of the old pupil, which was uncovered by the second incision, but this was quickly absorbed. There was a slight escape of semifluid vitreous at the point of incision, which exhibited some turbidity. I was able to obtain a nice, open pupil, somewhat triangular in form, with the base located downward. The blood quickly cleared away. At the end of two weeks the refraction in the right eye was  $S + 11.D \subset C + 1.D$  Ax  $110^\circ = 20/70$ , and  $S + 4.D$  added gave J-8, which subsequently became reduced to J-12.

December 19, I showed the result before the Section on Ophthalmology of the College of Physicians of Philadelphia with the comment that "the slight iridescent reflex in the pupillary area of the right eye may indicate the formation of an adventitious hyaloid membrane and may call for further operative interference." December 28, this appearance had become so pronounced that a V-shaped incision was made in this membrane, which gave a distinct sense of yielding as the incision opened up. No reaction followed, and at the end of one week the refraction proved to be the same as before, but vision was now markedly improved, the distant vision with the same glass being 20/30 pt. and J-1 for near.

#### CONCLUSION

Adventitious hyaloid membrane, altho of rare occurrence, is a distinct patho-

logic entity. During an experience of more than thirty years, I have observed only seven or eight cases, altho others may have been overlooked by me in the hasty routine of practice. The cardinal symptoms as stated are (1) lowered visual acuity for near when the distant vision is good, and (2) the presence of an iridescent vitreous reflex as revealed by oblique illumination. Altho it occurs

as a sequel of an operation for secondary capsular cataract, its presence demands a *pro forma* repetition of the V-shaped incision in order to divide the film and restore normal vision. A cursory glance at the literature reveals nothing of importance concerning this condition, and I have concluded, therefore, that the subject might stimulate thoughtful discussion and the reporting of similar cases.

## COMPLICATIONS IN THE INTRACAPSULAR EXTRACTION OF CATARACT.

JOSEPH E. STERNBERG,

BOSTON.

From a personal experience with this method of operation this series of observations is drawn. It takes up the different steps of the procedure one by one and gives its authors' conclusions.

Within recent years, much has been published in ophthalmic journals, relative to the advantages of removing cataract in its capsule. Papers have been read and discussed, but in very few of them have I been able to find reports dealing with postoperative developments, and the lessons learned therefrom.

My personal experience with twenty-three cases of intracapsular extraction, finds me most enthusiastic over the Smith cataract operation. I have been a close follower of Dr. Fisher's suggestions and technic, with most gratifying visual end results, in spite of the long delays of some of my cases healing, the cause of which I will touch on later. The twenty-three cases from which these deductions are drawn were ideal ones, careful examinations being made as to histories, light projection, blood pressure, tension, teeth, urinalysis, and physical condition, ages varied from 58 to 82.

THE INCISION, as suggested by Col. Smith and recommended by most others, should end within the limbus, from 1 to 2 mm. In my first nine cases this method was closely followed with rather disappointing results, requiring from 10 days to two weeks for the wound to seal tightly. This fact tempted me to try a slight conjunctival

flap, with pleasing results. In the next five cases firm union was noticed at the end of the fourth day in two cases, on the fifth day in the third and in the remaining two, on the sixth day. Altho contrary to the prescribed routine, eyes were inspected daily after the third day, to study the healing progress.

THE IRIDECTOMY. This cannot be improved upon, as now practised by most operators in their own manner, some doing a preliminary, others doing it at the time of the extraction. I believe that unless the patient is extremely restless and nervous, the iridectomy should be done at the time of the extraction, working on the supposition that entering an eye twice increases the danger two-fold. No preliminary iridectomies were made in my cases.

EXTRACTION OF THE LENS. To insure easy delivery, it is absolutely essential to make a fairly large incision, almost half of the cornea to allow for a possible large lens. It is not only essential but of the utmost importance to have an assistant who thoroly understands holding the Fisher hooks. Of the cases cited, vitreous was lost in only one (the 22nd), this being due to the faulty manipulation of the hooks at the crucial moment; the case how-

ever showed perfect healing at the end of the seventh day, and it was one where a conjunctival flap was made.

**TOILET:** In no case do I flush an eye after the extraction. Assuming that our field of operation is as sterile as it can be made, why introduce uncertainties? If a little secretion does collect I absorb it with a moist piece of cotton or withdraw it with a medicine dropper.

Many operators advise trimming the eye lashes of the eye to be operated on. I do not consider this an essential feature, but believe it rather detrimental. By allowing them to remain, one has something to take hold of in helping close down the lid after the operation and in raising it for inspection of the eye.

I have found of great value the application of yellow oxid of mercury with atropin to the lids of the operated eye, immediately after the operation; and yellow oxid of mercury without the atropin over the lids of the unoperated one, my reason for this being, that some reaction will take place in the eye-ball and that enough atropin may find its way thru the fissure to check what might be a severe iritis.

Postoperative pain occurs in most cases. This, in connection with the fact that the patients are required to lie on their backs for the first twenty-four hours, is very distressing, and calls for a sedative or a hypnotic. I have had excellent results from the use of sodium bromid in doses of twenty to thirty grains, given an hour or so after the operation. It answers a two-fold purpose, it is conducive to a good night's rest and relieves the nervous tension.

Since adopting the conjunctival flap, I have made it routine practice not to open the operated eye until the seventh day, altho the dressing is changed on the third day. This being done in a darkened room without inspecting the wound. The unoperated eye is left uncovered at this time, and smoke glasses No. 4 shade provided.

Many operators claim that iritis

does not occur as an after complication, this claim the writer can not substantiate, as almost all my cases showed some iritic symptoms, pain, circumcorneal injection, pain which was worst during the night and involvement of the ciliary vessels. These cases responded readily to the use of atropin and cleared in a few days. What produces the iritis? If all has gone well the question is a most interesting one. I am inclined to believe that the hyaloid membrane is the cause of this, due to its coming in contact with the injured iris, producing a mechanical irritation.

Recently I have made use of Dr. Jackson's cataract knife, the blade of which is about 5 mm. wide, rather than the one suggested by other operators and am very much pleased with it. The fact of its width gives a greater cutting surface with one thrust, eliminating the possible entanglement of the iris; and I suggest it be tried out.

#### CONCLUSIONS.

The section with a slight conjunctival flap is more efficacious than the corneal one, and healing is more rapid. This results chiefly from the blood vessels in the flap supplying nourishment to the wound, while the cornea has to depend on its lymph supply.

Make all sections large enough to insure the delivery of a possible large lens, and no complications will result.

Of paramount importance is the proper manipulation of the Fisher hooks by an assistant who knows how.

If all has gone well, do not inspect the operated eye for a week. You will be happily surprised with the healing progress, if you have used the flap method.

A preliminary iridectomy is not essential, furthermore it may be a source of danger.

Iritis does occur and calls for the use of atropin.

The use of the ointments as suggested will be found most practical.

Flushing the eye after the extraction is uncalled for, and should be dispensed with.

# NOTES, CASES AND INSTRUMENTS

## IMMEDIATE CAPSULOTOMY DURING CATARACT EX- TRACTION.

DR. FRANCISCO M. FERNANDEZ,  
HAVANA, CUBA.

The paper with a similar title, by Dr. Bennett (A. J. O. v. 2. p. 854), has very correctly brought to light the importance of employing as few instruments as possible in the operation for cataract, and altho Dr. Bennett wisely believes that the old Trousseau method could be somewhat amplified as to use some more instruments to avoid the unnecessary risks that a too crude technic may produce, we think that with a good assistant, the Trousseau method is quite a safe procedure.

The writer has been a partner of Dr. J. Santos Fernandez, the true old man of Spanish ophthalmology, for almost twelve years, and has assisted him in several hundred operations for cataract. The writer himself has been fortunate enough to have performed 600 operations for senile cataract and in more than 70 per cent of all of them the instruments employed have been only the cataract knife and the fixation forceps, when operating by the simple extraction method.

The Trousseau method, also employed by the old Spanish ophthalmologist, the late Dr. Cervera, should undoubtedly be considered as the preferred method, as regards the very slight chances of infection and the few seconds employed in the whole operation. A wider use of that procedure would surely gain for it many adepts. We heartily endorse Dr. Bennett's opinion of it.

The technic employed is simple. After the usual aseptic routine, the patient being ready for operation, the assistant holds with the thumbs of both hands, the lids of the patient, avoiding thus the use of blepharostat or lid holder. The surgeon grasps the conjunctiva over the tendon of the external rectus with the fixation forceps and

makes the puncture in the corneal border slightly above the line of the equator, and with the point of the same knife makes the capsulotomy, with a single stroke, carrying then the knife upwards and outwards, bringing it out on the other side; and finishes the incision after leaving a wide conjunctival flap.

We do not habitually use atropin to dilate the pupil previously to the operation; but have done so in many cases and find it a good procedure.

As we can not classify for the expert class that Dr. Bennett jocularly mentions, we have not qualified for the operation revived by Smith of India and simply side ourselves with Dr. Bennett, believing that the great rank and file of ophthalmologists, not being able to rank in the expert class, could really obtain good results with the simple method described, especially when a very wide conjunctival flap is dissected.

## DIONIN FOR WOOD ALCOHOL POISONING.

RALPH A. FENTON, A.B., M.D.,  
PORTLAND, OREGON.

The following case, originally reported in *Northwest Medicine*, gains interest and importance from the notes of its condition after more than two months from the ingestion of the poison.

A young professional man obtained about four ounces of what he considered grain alcohol from a stock bottle in a drug store, pouring it out himself. Analysis had disclosed the fact that he had taken denatured alcohol by mistake, comprising 90 per cent ethyl alcohol, 10 per cent methyl alcohol, and perhaps half a grain of corrosive sublimate to the ounce.

He consumed almost all of it, mixed with ginger ale, during the afternoon and evening of New Year's day. No discomfort was noticed until he awoke next day with vision down to the perception of large objects, polyuria and other



characteristic wood alcohol symptoms. He resorted to free saline purges, diuretics, and took much acid in the shape of fruit juices and sour foods.

When examined four days later he presented the usual dilated pupils, without reaction for light or accommodation, vision reduced to 2/200, loss of red and green perception, and a large central blind spot in each eye. The retinas were very edematous above, below and toward the macula from the optic disc. There was a deep-seated ache behind both eyes.

A solution of dionin, 5 per cent, was instilled into each eye, with the usual reaction of smarting and swelling of the conjunctiva. The aching previously complained of was much less in an hour's time. Free use of sodium bicarbonat by mouth was advised,

and he was sent home to use the dionin daily for three days.

On his return vision was 20/20 right, 20/15 left; he reported awakening the morning following the first use of dionin, seeing all objects fairly clearly, but tinged with red. In an hour's time they had turned green, and by afternoon had resumed normal colors. He continued to use the dionin three times a week.

March 5, two months after ingestion of the poison, this individual again presents himself, with dilation of the pupils, vision both eyes 20/20, fields slightly contracted, and both nerve heads distinctly pale. The retinal edema has gone. He has become slightly nyctalopic and finds considerable trouble in driving along white roads in the bright sunshine. This is relieved somewhat by tinted lenses.

## SOCIETY PROCEEDINGS

### AMERICAN ACADEMY OF OPHTHALMOLOGY AND OTOLARYNGOLOGY.

#### OPHTHALMIC TRANSACTIONS

Cleveland, Ohio, October 16-18, 1919

President, DR. J. M. INGERSOLL.

#### The Academy in the Recent World War.

DR. ALLEN GREENWOOD of Boston read a paper describing participation of the Fellows of the Academy in military service to which was appended a list of these members and their activities. **Department of Head Surgery in Army.**

DR. WALTER R. PARKER, Detroit, Michigan, said: When we first started, and after several months, there was not a specialist in any general hospital. Before the war ended every general hospital in the United States, at the request of the general officer, had an eye, ear, nose and throat man on its staff. It is felt there is room in the wards of the modern hospital for these men. If I were consulted on the special work again I would recommend that the brain and peripheral nerve work be

kept in general hospitals. But I believe the plastic work on the face is so particular it should be a specialty. I think the best way to get a personnel would be to have a modified "Oglethorpe". This would give us a list of men who are willing to go, and they would be organized and have a personal examination and intensive training. The list in the surgeon general's office would show when each is qualified to do the work.

#### Industrial Conservation of Vision.

DR. E. M. SHANKLIN, Hammond, Ind., read a paper on this subject. The attention of manufacturers, particularly those engaged in the iron and steel industries, has recently been drawn to the necessity of guarding employees against eye injuries. Coincident with the action of the various national and state societies in appointing committees on conservation of vision, various manufacturers began the study of the problem—first by the appointment of safety committees and later by establishing casualty departments. The latter method was prolific of immediate

and astonishing results, as is evidenced by an immediate reduction of 80% in eye injuries in one plant. Goggles at once became a necessary part of the equipment of all employees, in those departments furnishing the greatest number of eye cases. One casualty manager reported but three eyes lost in twenty-seven months in the nine plants of his company; and in but one of these cases did the employee wear his goggles.

Exposure to strong light and heat are guarded against by various combinations of colored lenses and thus another common cause of injury is controlled. The organization of Industrial Boards in various states has added to the work of the casualty managers in no small degree. Employees no longer wait months or years to receive payment for injury, nor do they have to prove negligence. Malingerers were very frequently before the boards in the early days of compensation law and are not yet uncommon. The necessity of sending eye cases to trained oculists is rapidly becoming apparent to casualty managers, and particularly to the liability companies, as is the importance of physical examination of employees. The dangers of permitting "store room experts" and other untrained men to treat cases of eye injury are being recognized.

DISCUSSION.—Dr. V. A. Chapman, Milwaukee, hoped for information concerning occupational diseases of the eyes, particularly those which occur in workers in chemicals, in connection with the munition factories and other plants of like character. Standardized protectors have recently been proposed by the Bureau of Standards of the U. S. Government. He would like to hear about them.

He would speak of the negligence by employers of labor, regarding the vision of the employee with respect to the work that the employee is placed to do. They go to great expense in getting an efficiency expert to plan their factory buildings; to lay out the floor plans as to the placing of their machinery so that it will work to the best advantage; and they have paid

attention to the proper lighting of the factory rooms. They realize the necessity of this for the promotion of the greatest output efficiency. Yet they hire workmen to operate machines without regard to the workman's visual acuity; which has much to do with his capacity, and their ability to get the highest efficiency from the plant.

He pointed out some years ago, the necessity of examining the eyes of prospective employees before they are taken into employment. The wisdom of this has been demonstrated many times. Some time a bureau will be established which will provide accurate information, from records, to employers of labor, and Industrial Commissions concerning the physical condition of workmen. A clearing house, by which the employer will receive protection in case of industrial accidents, and will be able to place the man at proper work, to the mutual advantage of the employer and employee. This would lessen the danger which an employee of low vision works under at certain employments. It would enable the Industrial Commission to render a just verdict as to the compensation the workman is entitled to after he has received an injury. It would enable an employer to place his employees at such work as their vision enables them to do with the greatest efficiency.

A man employed on a structural steel building a hundred feet from the ground, had vision in one eye of less than 20/300. While at work a piece of steel flew into his good eye. The man was helpless. He had sense enough to cling to a steel beam with his eyes shut until help reached him, otherwise he would have fallen to his death. That man belonged on the ground.

A knitting factory installed a machine to do fine knitting, formerly done by hand. A few weeks later the manager asked for help concerning this machine. It required close watching during its operation. Some seven or eight girls had refused to work on it after a few days, because it gave them severe headaches and they could not stand the work. They sent to my office one of the girls, who liked the work and

wanted to continue it; but simply could not do it on account of the eye strain. We found she had considerable refractive error and some heterophoria. After a short course of treatment and the proper correction of refractive errors, the girl has been operating this machine for months; with the greatest satisfaction to herself and her employers. This matter is worthy of deepest consideration in the industrial conservation of vision.

Dr. G. H. Mundt, Chicago: The man who has a severe injury to his globe will get into competent hands. The man who has a foreign body in the cornea would probably receive the attention of a fellow employee. Until the union is educated that it is not safe for the man, for the employer or the general public that he be employed, you cannot be as careful in employing a man as you should be.

Dr. F. Park Lewis, Buffalo: There are two topics involved in this paper of Dr. Shanklin's. The first is the care of injuries of the eye, and the men understand this. But the preventing of injuries is a sociologic topic, and it is not one we can reach without the cooperation of physicians with those employing labor, those having to do with the question of rates, and of others. Last year a survey was made of a number of industrial institutions in Buffalo and an investigation made as to preventive measures. That reaches one community. There are hundreds of communities in which this has not been done. The only way it can be made effective is by an organized, cooperative movement. It is essential there shall be groups of men who feel some such methods as those used in the National Association for the Conservation of Vision can appeal to the employee, the employer and the doctors. The unions do not want preliminary examinations. But when the employer, the illuminating engineer, and all others who would be interested in work of this kind get together, it is hoped to have an organized movement by which we can limit the injuries to the eye.

Dr. Nelson M. Black, Milwaukee:

The National Safety Code for the Protection of the Eyes divides the various processes in which it is necessary that the operator be given protection for the head or eyes or both, into nine groups, each one of which requires a protector of a particular type. The examples given under each group are only illustrative. The groups are as follows:

Type A. Protection from relatively large flying objects; as chipping, caulking, and riveting.

Type B. Protection from flying metal; as babbitting, pouring of lead joints, pouring hot metal and dipping in galvanized tanks.

Type C. Protection from dust, and light flying particles; as in scaling, grinding, stone dressing and wood working.

Type D. Protection from gases, fumes and liquids; as in handling of acids and caustics, nitrous fumes, dipping in galvanizing tanks, japanning.

Type E. Protection from excessive dust and light flying particles; as in sand blasting.

Type F. To intercept injurious radiant energy to a moderate degree.

Type G. To intercept injurious radiant energy, and a large part of the visible radiant energy; as in electric arc welding and cutting.

Type H. Protection from dust and wind; as in truck driving.

Type I. Protection from reflected light or glare; as long exposure to snow-covered highways, glare from lights, exposure to reflected sunlight, from roofs, road beds, etc.

Dr. A. C. Bennett, Buffalo, N. Y.: In the early part of the war, in five weeks I had seven cases seriously injured from breaking goggles. They should be properly made. In two cases the cornea was divided across, and in one case the sclera was perforated. In one case the eye had to be removed.

At present the commissioners give us the vision on the 20/20 standard, a man with a vision of only 20/40 gets the full compensation for the loss of vision. He has lost some vision, but it does not seem right that the loss of one-half his central vision, should go

for the loss of that eye. The loss of vision is not simply the loss of central sight.

Dr. Shanklin, closing: Several have mentioned the employees or unions being opposed to physical examination. If you have read the demands made by the steel strikers now out, you will remember that the last clause is as follows: "There shall be no physical examination of employees."

In the Calumet region, the iron and steel industries are waking up to the fact that they have to have physical examination of their employees. We have one of our railroads that has no physical examination of employees whatever. One of the employees had quite an injury to one of his eyes. I discharged him, and later on in conversation I said I would not make a final examination and certify him for work until he called again. He said that was not necessary, it was not required on his road. If they can see a box car ten feet away that is all that is required on this trunk line. The manager told me the other day they are working on a plan now whereby they will have the employees examined.

In this matter of compensation, I am not ready to adopt any of the percentage charts that have been adopted. I like Dr. Chapman's chart better than any I have seen, but I am not ready to accept that.

### **Hysteric Amblyopia.**

DR. FREDERICK TEAL, Lincoln, Neb. read a paper discussing the causes of this condition and its chief characteristics, especially the disturbances of the visual fields and color senses. He referred to the difficulty of distinguishing between malingering and hysteria, and reported cases showing the difficulty of diagnosis.

DISCUSSION. Dr. J. M. Banister, Omaha: Our English confreres devote a good deal of attention to psychic injuries. They report shell shock occurring in cases where a man is of unstable nervous system and shows great fear, and his mind has not the proper resistance. He gets a mental suppression of vision. I think the

shell shock has a good deal to do with the psychical. It occurs in people of unstable nervous system who should not have gone into the army.

Dr. Walter Lancaster, of Boston: A great deal has been written about the ocular symptoms of hysteria and our knowledge of these symptoms is fairly complete; the contracted fields, the good orientation in spite of the contracted fields, as shown by the patients moving about without running into and stumbling on things, the reversal of the color fields, the predilection for red, so that red is seen better than the other colors, the areas of local anesthesia of skin or mucous membrane, especially on that half of the body corresponding to the eye with the greater amblyopia or more contracted field and the motor symptoms of ocular hysteria, spastic rather than paralytic.

Why, then, is the diagnosis of hysteria so often baffling? It is not simply because it must be largely made by exclusion, since it must be shown that no adequate ocular disease exists to produce the symptoms. It is not because the diagnosis has to rest on the way the ocular symptoms are accounted for.

There is something more needed to make a positive diagnosis of hysteria than the presence of isolated symptoms, such as amblyopia, without discoverable organic cause. Moreover, hysteria may exist even in the presence of organic lesions adequate to produce many of the symptoms.

My plea is that a better understanding of the nature of hysteria will help tremendously in elucidating ocular symptoms suspected of being hysteric, but about which there is uncertainty. The neuro-psychiatrists have thrown a flood of light on the nature of hysteria; and, as it seems to me, answered some of the questions raised by Dr. Teal.

Let us take a few simple cases. A soldier who has several weeks service at the front, has seen wounds, suffering and death, has suffered with cold or heat, hunger and lack of sleep so that he is pretty thoroly fatigued, finally he is standing by when a



high explosive shell falls amid a group of his intimate comrades, killing some and horribly mangling others. He himself does not receive a scratch, but is struck blind. We examine his eyes and find his media, retina, optic nerves, pupils all show absolutely nothing to account for it, and we say he was not wounded. Yet it is hardly a far-fetched figure of speech to say that he has suffered a most severe wound. He has seen a sight which was literally more than he could bear. His *consciousness* has had a wound inflicted on it of staggering severity. His eyes continue to see, but as a defense reaction, the sensation is cut off from his consciousness; and he has not the slightest idea what the explanation of his blindness is.

Again, a man passes a night of anguish, hearing wounded comrades groaning and crying for help. The morning finds him deaf, as a defense reaction against a situation which has become intolerable to him. The ability to hear is repressed or inhibited, so that altho his ears are normal, the sensation of sound does not reach his consciousness. In all such cases the reaction of the patient is a defense reaction taken to escape an intolerable situation.

A muskrat caught in a trap, reacts by gnawing off his leg above the trap, and so escaping an intolerable situation. A man in some situation involving his arm, for instance, the prospect of having to use it to hold a rifle and draw a trigger under circumstances which have become to him intolerable, reacts not by actually severing his arm from his body, but by so severing its connection with his consciousness that he is unable voluntarily to move it—it is paralyzed.

These are very simple and plain cases, but the neuro-psychiatrists are able to elucidate and explain the more obscure cases of hysteria on similar lines. I am trying to point out that here is an important field for us to study if we wish to really understand the nature of hysteria; and that unless we understand the nature and mode of genesis of hysteria, we are greatly

handicapped in both diagnosis and treatment.

Lastly, I wish to show that there is a close relationship between hysteria and malingering and that we shall be aided very much in differentiating them by acquiring a grasp of the psychology of the unconscious and the modern theories of hysteria.

The hysteric reacts to an intolerable situation, of which he is not aware, by an adjustment which is *unconscious*. With the malingerer the intolerable situation and his reaction to it are both on the level of consciousness. He knows what he is doing and deliberately deceives. The hysteric has no idea that it is because he is executing a defense reaction to an intolerable situation that he is the victim of his symptoms.

Dr. H. B. Young, Burlington, Iowa: There was a time when the diagnosis of tubercular meningitis was on the same plane as hysteric blindness. We only know that the hysteric blindness gets well. They do not like the term. They think the sickness is pretended.

Dr. E. B. Heckel, Pittsburgh: The use of the word "hysteric" is unfortunate, as it leaves a false and bad impression. I would suggest that we substitute the term "psychic amblyopia" and "psychic amaurosis".

Dr. Walter Parker, of Detroit: One clinical point: By suggestion you can get almost any field of vision you want. It is interesting to have the field taken by four or five competent observers and compared with the fields you get.

Dr. A. G. Bennett, Buffalo, N. Y.: A boy of six, neurotic, the son of a neurotic father, a marked epileptic was brought to me by the mother, who complained he had been poisoned by vaccination. He had complete external and internal ophthalmoplegia. His eyes were set as tho in plaster. His accommodation absolutely was gone. I came to the conclusion it was hysteria. I had the mother, after the child was fast asleep, tell the child: "It will be better in the morning." In four days the child was perfectly well.

Dr. C. W. Hawley, Chicago. In examining the field as to color, when it

will vary with each examination, that indicates a hysteric condition. I have examined it and in a half hour found it entirely different. There is such a thing as traumatic amblyopia in which you find the same destruction of color perception. The red and the blue in the traumatic cases will be perfectly alike but in the hysteric cases will vary greatly.

Dr. Allen Greenwood, Boston: We saw a great deal of this type of war neuroses in France. The hysteric element, the attempt to get away from an intolerable situation, was shown when the majority of the patients promptly recovered. A child with vision of 20/200 is trying to escape an intolerable situation, the school; and you can, with a little advice to the parent and to the child bring him to recovery. In the war some would escape the intolerable situation by self-inflicted injuries. They would wound the middle finger, or the forefinger, or the foot. I think they should be classed as defectives, who should not have been in the service. I think there is no one but has a limit to the situation which he can stand. We might any of us find an intolerable situation. Something is bound to break, and there is an inhibition of the central nerves. When the Day of Judgment comes we recover.

#### **Cysticercus of the Vitreous.**

Dr. Louis Love of Philadelphia, exhibited water color drawings made from a case by the late Margaretta Washington. These showed the parasite in different positions in the vitreous also a possible tunneling or tract in the choroid, before the parasite made its exit into the vitreous. The diagnosis was confirmed by the late Dr. Herman Knapp, who stated that it was the first time he had made this diagnosis in America. The case was first seen in 1906. The patient is still living, and as far as could be learned the eye has remained quit.

DISCUSSION. Dr. Meyer Wiener, St. Louis: I saw one case in my own practice at home, and one which was seen in June at Oglethorpe. According to the pictures shown by Dr. Love

this case of ours was much more active than his, and it took up most of the vitreous body. The entire history was different. Our patient was a young girl, 19 years of age, who ten months before I saw her had good vision. She consulted an ophthalmologist who diagnosed it as retinitis. She came to our service at Ft. Oglethorpe and we made a diagnosis from the large sized body and the large neck and head. It seemed to be stimulated by the light from the ophthalmoscope. All that was needed was the light to get it to come out and show itself. When I first saw the patient there was no light perception in this eye. The other eye was normal. Physical examination of the patient was negative, but in the stools we found the eggs of the tapeworm.

Regarding the treatment of these cases, I thought we would have a comparatively easy time in removing this in toto or in part. After making an incision in the sclera, using the ophthalmoscope in one hand and the forceps in the other, when I grasped the neck with the forceps, it was as tho you tried to pick up a piece of jelly. The cyst collapsed and we could do nothing further. The eye was removed therefore.

Dr. Clarence Loeb, Chicago: I want to add to the case, one I saw fifteen years ago with Dr. Carl Barck. It seemed most like a pulsating body. By close examination we could see one or two hooks. It was operated on and there was a sudden gush of fluid, but it came away, and it was followed by a scar formation in the retina and choroid. The eye got well.

Dr. James M. Patton, Omaha, Neb.: I wish to mention a case that was diagnosed as cysticercus. A young Greek of 18 or 20, consulted us on account of failing vision in the right eye. We found a vesicle in the upper nasal quadrant, but it did not have the ordinary retinal and choroidal attachments. After examining it myself and after consultation with Dr. Gifford, we decided it was a cysticercus in a quiescent state, and the parasite was probably dead. We were able to recover evi-

dence of tape worm in the examination of the stools. He gradually developed a full cataract. After we removed the cataract we were unable to find the cyst.

Dr. Allen Greenwood, Boston: In a case I encountered a mass was seen just above the macula. The next day it had moved to below the disc, and the next day it nearly covered the disc. On the fourth day it had grown larger and showed very clearly. It had moved about 5. D. and was growing rapidly. I performed a similar operation to Dr. Wiener's. I placed the forceps so they came on each side, but when they came away there was a gush of fluid and I got no cysticercus.

#### **A War Crisis as to Eye Diseases and Blindness.**

Dr. LUCIEN HOWE, Buffalo, read a paper pointing out the valuable results of studies regarding vision made in the laboratories of the aviation service; and urged the benefit of a permanent government laboratory devoted to such investigations.

DISCUSSION.—Dr. Wm. E. Bruner, Cleveland, O. Three years at Mineola have demonstrated clearly the value of medical laboratories. Young men of special ability could be encouraged to give themselves to research work; and with full remuneration so that some really scientific progress could be accomplished. The placing of the clinical branches on some such basis will be a long step towards the accomplishment of this ideal. More prompt action towards encouragement of such scientific work has been made possible thru this association. We have a good sized surplus in the treasury, and it was decided to raise the dues from five to ten dollars a year, so it will give us a fund of \$25,000. Some plan can be instituted to enlist workers in laboratory and surgical work.

Dr. R. H. T. Mann, Texarkana, Texas: I have thought a great many times of what we were going to do. How we were going to meet the need since Germany and Austria can no longer do what they have been doing for the medical profession. America

has it to do. America is the only country which can do it. The way to do it is to get the National Government under it, and convince them that money invested in this way is well spent, thus going into the saving of individual life.

#### **Removal of Magnetic Foreign Bodies from the Vitreous.**

Dr. LEE MASTEN FRANCIS, Buffalo, read a paper, the purpose of which was to discuss the selection of the route and method of removal, and especially detail the technic of extraction. The necessity was pointed out of having sufficient views of the foreign substance to establish its size and shape, the danger of exposing to the magnet an eyeball with a foreign body before knowing its location. In the selection of route and method the surgeon should be governed by the location, size and shape of the foreign body. The anterior route was chosen with giant magnet, and the posterior route with the hand magnet. He pointed out the value of the double conjunctival flap, both as an aid in extraction and a method of sealing the wound.

DISCUSSION.—Dr. E. C. Ellett, Memphis, Tenn.: Nearly twenty years ago I treated a lady who had a small metallic foreign body enter the eye, pass thru the lens and lodge in the retina. It was removed with a small magnet thru a scleral incision; the lens did not become opaque and she still has 20/20 in that eye. I think to have drawn that foreign body back thru the anterior chamber might have wounded the lens and the iris and secured a less satisfactory result.

Many of us do not have a satisfactory giant magnet available; but we all probably have access to a small magnet. With all the needed apparatus, and with experience in the use of this formidable weapon, its good qualities cannot be denied. But with instruments of more moderate power, a foreign body cannot be pulled thru the anterior chamber, unless it is of such size that its passage is attended with the possibilities of very great damage to the eye.

The matter of localization of the foreign body by the X-ray is of greatest importance. With a sufficiently powerful magnet and other favorable conditions, the foreign body may be drawn into view. But when it is in the anterior chamber, and often entangled in the iris, its removal is often very difficult. With small foreign bodies, accurately localized, my own experience is in favor of the small magnet and the scleral incision. I have used with much satisfaction, Dr. Francis' ingenious method of closing the conjunctiva over the wound.

Dr. E. L. Jones, Cumberland, Md.: The greatest danger of penetrating wounds of the eyeball is sepsis. Lymph is Nature's bactericide. I show the amount of lymph which is produced by a dose of cyanid of mercury (exhibited two bottles of lymph). Each one of these bottles represents the washing out of a body that was in the eye two hours. You can see from the enormous amount of lymph why you get these wounds restored.

Dr. E. B. Heckel, Pittsburgh: The eyeball with a foreign body in it, practically speaking, is not only a blind eye but a lost eye. In regard to the giant magnet as a diagnostic agent I want to say that it is not proper. It is foolish to guess when it is possible to know. The X-ray gives a positive diagnosis. Our practice is not to tamper with an eye; pay no attention to the history, keep it clean and have it X-rayed.

The anterior route I have absolutely abandoned. I think the best practice is to take the shortest possible route. Foreign bodies the result of flying pieces are always angular and sometimes there are several sharp points. It is risky trying to take it out the anterior way. When the current is turned on I think no man is quick enough to judge when to turn it off, in an eyeball of an inch depth. I have abandoned the giant magnet and use the hand magnet.

Dr. Greenwood: I have failed to get a foreign body with the hand magnet, then applied the giant magnet, and finally finished removing it with the

small tip. I shall always believe that in times of military stress the giant magnet is of wonderful use. You can make the diagnosis and remove the foreign body on the spot without damage to the eye. You sometimes have patients where you can't get them X-rayed, and the large magnet, such as that of Dr. Lancaster, is of great use.

Dr. Patton, of Omaha. I have found that the X-ray men are earnest, scientific, cooperative gentlemen; and if we will assist them they are perfectly willing to learn the localizing methods. Several years ago I placed foreign bodies in the eyes of animals and had them fixed; and our X-ray man worked out his technic until he became efficient in his work.

I agree with the gentleman with regard to the danger of using the giant magnet for diagnostic work. The patient is entitled to our greatest skill, and unless we do get that foreign body from the eye, it is not only lost but it may become a menace to the other eye.

Dr. C. W. Hawley, Chicago: I had the honor of removing a piece of steel that had been in the eye nearly a year, with perfect success and 20/20 vision, I always prefer the posterior route. I make just as small an incision as possible. The peculiarity that I would call attention to is that when you start to remove the magnet the piece slips. Remove it rapidly, because it will always turn on the magnet if it comes slowly.

Dr. F. Park Lewis, of Buffalo: After the foreign body gets into the anterior chamber, it very much complicates things if it is allowed to get back behind the iris. It easily gets entangled in the iris and it is important to keep it in the anterior chamber. I have seen serious complications follow.

Dr. Francis, closing: I want to express my admiration for Dr. Jones' tear vases. I agree with Dr. Jones and have demonstrated the value of bichlorid of mercury subconjunctively. I agree with Dr. Patton that not many are competent to take X-ray pictures, that can be developed to the point of making a satisfactory diagnosis and location.



### Correction of Symblepharon by Use of Mucous Grafts.

George B. Jobson, Franklin, Pa., read a paper on this subject. The symblepharon is separated from lid, culdesac and eyeball, if necessary and a flap used to cover as much of the eyeball as it will. The symblepharon flap is stitched to the eyeball. \* A flap including mucous and submucous tissue is taken from the inner surface of the lip, stitched to the surface remaining denuded on the eyeball, and inner surface of the lid. Mattress sutures were used in the culdesac.

DISCUSSION. Dr. John M. Banister, Omaha: I have been much interested in this paper, because there is nothing more discouraging than one of these bad cases. In 1897 I did an operation on a man who was suffering from marked pannus. I referred him to another man who did nothing, but in six days he sent for me. I dissected the upper lid with great care from the cornea and everted the lid. Then I filled that eye full with sterile vaseline and put gauze over it. When I took the lid down the man was cured and never had any trouble with it.

Dr. Lee Masten Francis, of Buffalo: The late Dr. Beard of Chicago was fond of mucous grafts. He got them in a unique way by turning out the cheek with the thumb and trimming them from the buccal surface. It was less trouble than that described.

Dr. Meyer Wiener, St. Louis: This technic of Dr. Jobson's is quite similar to one advised by me ten or twelve years ago. He has merely reversed the use of the flap. Eleven or twelve years ago I utilized the scar of the symblepharon for making a lining for the lower lid, and then filled up the rest of the ocular surface with an epidermal graft, holding it in with a plate which I make of cardboard. It is easily obtained and nonirritative when covered with paraffin. It can be horse-shoe shaped, so as to be held in place and still not interfere with the cornea at all. Since having experience with it in the Army, I think we have a better means of relief by the Esser direct skin graft.

Dr. E. E. Blaauw, Buffalo, N. Y.: In the war we have learned that we can sever organs; we also take nerves and arteries, and put them in fluid and leave them for weeks and they serve a good purpose. I wish some of the younger generation may try to take mucous membranes from the mouth and cheek, and see if you can preserve them so they will be useful.

Dr. N. W. Price, Niagara Falls, N. Y.: I wish to present what we use in Niagara Falls. We have a good many cases of burns in the chemical factory. I use an artificial eye to start with, and take it to a mechanical dentist, and have him make a form of rubber the same shape as the eye and leave the cornea out. When one of these cases comes in we insert this, and he wears it until the burn gets well.

Dr. A. G. Bennett, of Buffalo: With reference to the procedure suggested by Dr. Banister, I recall that I was a student in 1890, and my preceptor everted the lid upon the forehead, and let it down in ten days or two weeks after. That was for a burn with caustic potash, and the whole conjunctiva in the front part of the eyeball, ocular and orbital was involved.

Dr. E. B. Heckel, of Pittsburg: It is better to prevent such conditions. For some time I have been using this method for burns with hot metals. The patient is put to bed, and one to two drops of one per cent solution of sterile olive oil are instilled two or three times a day, and hot pads applied. The operation depends on the kind of destruction.

### Ophthalmic Education and Text-Books.

Dr. Clarence Loeb, Chicago, read a paper published in full in this Journal, v. 3, p. 121.

DISCUSSION. Dr. Edward Jackson, Denver, Colo.: Ophthalmology can be learned in two different ways. First as a branch of science, with a certain relation between its different parts; certain relations between anatomy, cases and symptoms, treatment and prognosis. That is what we have in

the average text book or article. But we must have another way of looking at disease—taking the symptoms most evident and from them reasoning our way to apply the systematic academic knowledge. The medical course gives first place to fundamental branches and the study of disease from the scientific side. After the student has become acquainted with the general field of medicine, he must study it over again to be able to cope with the individual case that comes before him; and that is what is meant by the clinical years in a medical course. We deal with words and we deal with the things they represent. But the word is of little value until it stands for its full, clear meaning in the mind of the student.

Dr. Meyer Wiener: The greatest fault in my experience, is not in the inability of the student to construct a diagnosis from his findings in a given case, but an almost universal lack of power of observation, and of systematic methods of examination. An experienced ophthalmologist glances at a patient and discovers that he has a foreign body in the cornea. He perceives a pericorneal injection, which tells him that there is an involvement of the cornea, or the iris, or both. He sees that the iris is clear or relatively so, and finds the corneal affection. To my mind, the present method of teaching, didactic and text-books, is correct; in as much as it prepares a foundation for the student so that he may have a general working knowledge of the subject. This is supplemented later by clinical teaching, which must have for its prime object the emphasis on systematic examination of the patient. A lack of systematic and careful training of the student's power of observation is the most serious defect in the education of the ophthalmologist.

The disease must first be analyzed before it can be reconstructed from a summary of the findings. A book such as Dr. Loeb suggests would make an excellent reference dictionary of ophthalmology, but could not replace our present text books.

Dr. G. W. Boot, Chicago: I feel the

text book Dr. Loeb advocates is radically wrong. If his idea is correct, a homeopathic dictionary would be the thing. Going over your case systematically can be carried to extremes and waste a lot of time in trying to find out what is the matter with your patients.

Dr. R. H. T. Mann, Texarkana, Tex.: The text books are deficient in pictures. We should have entire picture books of diseases of the eye. We learn by seeing things. The eyes are to see with. The whole world is looking at pictures. Why not teach ophthalmology by pictures? I can learn more from a picture and a hundred times easier than to sit down and read.

Dr. Allen Greenwood: The one thing that should stand out most strongly of all the requirements is the training of the power of observation. That is the thing that most of my students lack, the power of trained observation, and that training begins from the cradle up.

Dr. Loeb, closing: The mode of teaching which is being used could be supplemented. Dr. Wiener seemed diametrically opposed, but he says you look and see a corneal injection and you think of corneal infection or iris infection. That is just what I said that students should do. But when you started out in practice you said, "Is this cataract," and you proceeded to hunt for those certain symptoms. If you had been taught the synthetic method of looking for symptoms or signs, you would have done better.

Dr. Mann's desire for pictures is good, but you cannot learn by pictures alone. I agree with Dr. Greenwood that observation is all important. The emphasis should be laid upon the symptoms or signs, and then having found them, build them up into a disease. That is the way you make your diagnosis today. When you first went out to practice you thought, "Is this a disease of this kind?" Then you tried to find if its symptoms were present; and if you were fortunate, you made a correct diagnosis, and if not, you had to make another.

**SECTION ON OPHTHALMOLOGY, COLLEGE OF PHYSICIANS OF PHILADELPHIA.**

December 18, 1919.

DR. WILLIAM T. SHOEMAKER,  
Chairman.

**Persistent Pupillary Membrane.**

DR. P. N. K. SCHWENK showed a case of persistent pupillary membrane in a girl, aged fifteen years; born in Russia; came to this country when eight years old. Personal and family history negative. The patient had measles in infancy and scarlet fever at the age of seven years. About four years ago, while attending school, she first became aware of trouble with her eyes, but was thought only to be nearsighted. Glasses were first prescribed for her at the City Hall in this city. She was reexamined each year following, but innocently consulted fake optical clinics. Her last pair of glasses were shop glasses obtained one year ago. She came into Dr. Schwenk's clinic at the Wills Hospital in November, 1919, complaining of poor vision, pain in both eyes after reading or writing and excessive lacrimation, conjunctiva nothing unusual. On first general examination cornea and pupils appeared normal. A mydriatic was ordered, and under mydriasis the pupils were somewhat irregular, but unlike that due to posterior synechia. In the right eye there are three distinct bands attached to the smaller circle of iris, brown in color and crossing the pupil to opposite side, and adherent to lens capsule in pupillary area giving an appearance of a brown membrane on lens, almost covering the pupillary area. Left eye has four bands crossing from side to side nearly at right angles, giving a brownish membrane appearance on lens capsule. In addition several fine filaments can also be seen. Right eye vision 20/200 S. — 2.50 D = 20/70. Left eye vision 20/70 S. — 3.00 D = 20/50. Dr. Schwenk feels justified in attempting to remove the capsule or membrane at the risk of having to do a curettement of lens.

**Burn of Eyes By a Salt of Copper.**

DR. HOWARD F. HANSELL read the report of a case published in full in this journal, p. 208.

**Occlusion of Macular Artery By Endarteritis.**

DR. LUTHER C. PETER reported the case of a young man, aged twenty-three years, who has recently been discharged from the service as sound. Five weeks ago vision in the right eye suddenly became blurred. Two days later, when he presented himself at the Polyclinic Hospital, the patient presented the following condition:

Pupils equal, reacted to light and accommodation and convergence. Fundus examination of the right eye showed an opaque, gray area to the outer side of the disc, including the macula. The macular twig was completely occluded. A second macular artery was seen to traverse the upper border of the opaque area and to pass on to the temporal part of the retina. The disc was somewhat hazy; arteries and veins were somewhat indistinct because of the vitreous opacities. The veins in the periphery of the field were dilated and tortuous. Fluffy white masses floated in the vitreous in the neighborhood of the disc. Field studies showed a cecentral scotoma, with contraction for form and color fields. Wassermann was feebly positive.

Two weeks later the fundus picture was somewhat changed. The ischemic area in the macula was more sharply defined; the vitreous opacities were coarser and the deposits on Descemet's membrane were visible. Field studies showed a central scotoma for form, for green and red and an enlarged blind spot of Mariotte for these same colors. There was, however, a larger scotomatous area for blue, including both the macula and Mariotte's blind spot. Peripheral fields were about the same as when first examined, with the exception of the blue field, which was almost as small as that for green.

The diagnosis was endarteritis obliterans, with occlusion of the macular twig and partial occlusion of the central artery of the retina. Attention was called to the relative infrequency of

embolism of the central artery of the retina and its branches, and particularly to an isolated occlusion of the macular artery either from embolism or thrombosis. The enlarged scotoma for blue and the contraction of the blue field relatively greater than that for red and green was indicative of involvement of the choroid, the contraction of the blue field being an early evidence of nutritional disturbance of the neuro-epithelial layer of the retina.

#### Unusual Form of Proliferating Retinitis.

DR. PETER showed an unusual form of proliferating retinitis in a young woman, aged twenty-eight years, whose history was entirely negative as to injury either at birth or subsequently. The patient discovered accidentally six years ago that her right eye was bad. Vision in this eye is 2/200, vision in the left eye 20/20.

Three distinct pathologic changes were present in the eye-ground: (1) Atrophy: There was evidence of atrophy of the temporal half of the disc, the macular twigs being very small, and there was also some contraction of the central artery of the retina. (2) Central choroiditis: A rather large atrophic area surrounded by pigment was observed below and including the macular region and extending toward the disc. In addition there was some mottling of the retina immediately around the disc. (3) A band of proliferating retinitis: This consisted of a regular diaphanous ring, bluish gray in color, about the width of the central artery of the retina. This ring began below the disc, passed around it in an oval fashion about one disc diameter away from it above, then finally terminated down and in blending with the surrounding retina. This ring was delicate, distinct and anterior to all the retinal vessels and slightly undulating below, where it was best observed with +4 D. It was not so well defined as the proliferating bands usually observed after trauma.

The author felt that the ring was the result of an injury probably received at birth or in early childhood and rep-

resented a tearing away either of the anterior limiting membrane of the retina or of the posterior limiting membrane of the hyaloid body, the edges of which had undergone a proliferative process and, therefore, had become visible with the ophthalmoscope. In the author's experience this case was unique.

#### Coloboma of the Macula.

DR. L. F. APPLEMAN presented a case of bilateral, symmetric coloboma of the macula, which was seen in Dr. Holloway's clinic at the Wills Eye Hospital. Vision had always been poor, especially in the right eye, which showed exotropia. When first seen her vision was: R., 6/60, L., 3/60.

The ophthalmoscope revealed a lesion in the macular region of each eye about one and a half disc diameters in size, with clearly defined edges and excavation amounting to about three diopters. The whole surface showed considerable pigmentation. The retinal vessels could be traced across the affected area. The optic disc in the left eye was atrophic but in the right eye was of good color. The peripheral portions of the retina were normal. The Wassermann reaction was negative.

#### Orbital Periostitis.

Dr. Wm. Zentmayer made a further report on a case of exophthalmos, with bilateral ophthalmoplegia. The patient was shown at the October meeting. Shortly after this a slight redness of the skin of the lid was noticed and palpation for the first time caused pain. There was also some spontaneous pain. There was a high leukocytic count. An incision was made into the orbital tissues along the supraorbital margin near the outer canthus and about a dram of pus was liberated. Motility of the eye on the opposite side to the exophthalmos was restored at the time of complaint of pain. Since the drainage of the pus the exophthalmos is slowly receding, the neuritis has subsided and the movements of the eye are increased. From the facts that there was not a continued flow of pus and that the pointing occurred at the



outer canthus the probability is that the condition was one of periostitis.

#### **Asthenopic Eyes.**

DR. S. D. RISLEY read a paper on "Some Recent Observations in Asthenopic Eyes," the full text of which will appear in this journal.

DISCUSSION. Dr. Howard F. Hansell said it was difficult for him to understand the reason for Dr. Risley's statement that the visibility of this ring is possible only with the retinoscopic plane mirror armed with +2 D. If the ring is a deposit on Descemet's membrane it should be seen with the aid of the loop or by indirect examination. If it is only a shadow near the periphery of the cornea and due to lack of uniformity of curvature of the center and periphery its relation to uveitis is not clear.

He will take the first opportunity to look for the ring and hope to be able to verify, by his own experience, Dr. Risley's interesting discovery.

DR. S. LEWIS ZIEGLER stated that he had not observed the condition described by Dr. Risley but thought that any such opacity in Descemet's membrane could be studied by using the S + 16 D lens in the ophthalmoscope to magnify it.

#### **Extensive Sclerosis of the Choroid.**

DRS. T. B. HOLLOWAY and A. G. FEWELL (by invitation) reported the history of a man, aged fifty-three years, who came under observation at Dr. Holloway's clinic at the Wills Hospital. He stated that he had had poor vision since childhood, but that he could read fairly well until twenty-six years ago. Since that time the vision has been much reduced, so that only large objects could be recognized.

The patient has a high myopia, but he has not been able to secure satisfactory glasses. There is no history of consanguinity. The patient has four brothers living, all of whom have poor vision, and four children living and well, and but one wears glasses. Two children are dead, one dying at the age of sixteen from pulmonary hemor-

rhage. He states he has always enjoyed good health and he has been temperate in his habits. His general physical examination failed to show anything of consequence aside from excessively bad teeth, with marked pyorrhea. The nasal examination showed marked deviation of the nasal septum, with some enlargement of the turbinates. The Wassermann test of the blood was negative.

In each eye the vision is reduced to counting fingers at two feet. The ocular adnexa are normal, corneae clear, anterior chambers rather deep, and pupils react normally. The tension of the right eye is 27 degrees and of the left 24 degrees. The intraocular examination of the right eye shows delicate posterior central lenticular disturbance, with scattered pinpoint opacities and punctate vitreous changes. The disc is markedly atrophic, with a large excavation. Extending from the disc well out beyond the macular region and to the midzone above and to the nasal side below there is a widespread sclerosis of the choroidal vessels. In this area all degrees of vascular change may be noted from delicate white vascular markings to complete fibrosis. In the extreme periphery there are also marked evidences of sclerosis, but not to the same degree. Both sets of retinal vessels are contracted to a minimum, the arteries being only threads. The left eye shows delicate central posterior opacities with slight linear scratches, also punctate vitreous opacities. The disc shows advanced atrophy with large excavation on the temporal side. To the temporal side of the disc and involving the macular region there is the same tendency to uniform fibrosis of the fundus structures as has been described for the right eye. The area of excessive changes on the nasal side above and below is not quite as marked as in the fellow-eye. Scattered about the periphery and central portions can be noted discrete but small clumps of pigment. The retinal vessels show the same excessive contraction.

J. MILTON GRISCOM, M. D.,

## ABSTRACTS

**Ch. Lafon. Pithiatic Spasm of Convergence and Accommodation.** *Ann. d'Ocul.*, 1919, vol. 156, p. 449.

After the appearance of Babinski's work, reports of cases of hysteric contractions almost disappeared from the literature, altho they had previously been very numerous. This was due either to the fact that they were really very rare, or that authors became more careful in their diagnoses. Even the war, with its emotional states, has brought only two cases. But the author has seen 7 cases in 18 months in a total of about 2,700 patients.

The ordinary method of testing associated movements is faulty in that it causes convergence at the same time. To obtain the former alone, have the patient hold his head immovable and look at an object about 45° to right or left, held so that it is not hidden by his nose; upward, have the patient look at an object held high up, or at the sky; downward, have the patient throw his head as far back as possible and look at an object in front of him.

Three different tests must be made; (1) movements of convergence, (2) movements of direction, (3) movements of direction combined with those of convergence. There are three clinical types of spasms. 1. Simultaneous spasms of accommodation and convergence. 2. Spasm of convergence. 3. Spasm of accommodation. Of 1 there are two varieties, (a) permanent and tonic, and (b) intermittent and clonic. Cases illustrating all of the foregoing forms are given. C. L.

**Georges Weill, Extraction of Senile Cataract with a Lance Knife.** *Ann. d'Ocul.*, 1919, v. 156, p. 338.

Georges Weill reviews the history of the development of its form and use. He has used the following method in about 400 cases with very satisfactory results:

Fixing the eyeball at the horizontal meridian, he introduces the point of

the lance in the corneoscleral region a little to the left of the vertical diameter and pushes it parallel to the iris very quickly towards the inferior angle of the anterior chamber. On drawing it out, always holding it parallel to the iris, he prolongs the incision in the limbus until it seems large enough, after which he follows the Graefe method. He claims:

(1) The incision requires no counter puncture and is very easy.

(2) The shape of the lance and its method of insertion delays the escape of aqueous and prevents cutting of the iris.

(3) The iris regains its position spontaneously or by simple massage of the cornea and rarely prolapses into the wound.

(4) The anterior chamber reestablishes itself more quickly than when Graefe's knife is used, lessening the danger of infection and making a conjunctival flap unnecessary.

(5) Postoperative astigmatism is less pronounced as the wound is more regular and the lips adapt themselves much better. C. L.

**E. Lindgren — Extraction of Secondary Cataract.** *Hospitalstidende*, vol. 66, p. 1230.

The author reviews prevailing methods of dealing with secondary cataracts and then describes his method used in cases of thick and dense secondary membranes following iritis. When 6 to 12 months have elapsed after extraction he makes an incision with a broad cataract knife or with a keratome opposite to the coloboma. Using Axenfeld's synchiotomes, he cuts the adhesions of the iris to the pupillary membrane, then grasps the membrane in the lower part with a sharp iris hook or with Arlt's iris forcep and rolls it up thru the anterior chamber and out thru the wound where it is snipped off as close as possible. In two cases a drop of vitreous was lost but in three others none appeared. D. L. T.

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## A STUDY OF LOCAL ANESTHETICS.

The Committee on Local Anesthetics of the Section on Ophthalmology, A. M. A., has sent out a circular letter of inquiry, for the purpose of obtaining information as to the personal experiences of the recipients with the various local anesthetics. From the replies received, it is their intention to formulate a report for presentation to the Section either at the New Orleans meeting or some later one.

This method of obtaining data is theoretically the ideal one, for no matter how extensive and varied the experience of any one man, or any small group of men may be, it can never equal that of the profession as a whole. Unfortunately, however, such circulars are often neglected or even ignored. The busy practitioner defers answering until some more convenient time—which never comes; and the less busy one modestly thinks that his relatively slight experience has little statistic value. The result is that usually only a small percentage of such letters are answered and the investigation does not yield its richest fruits.

No matter how busy a man may be, he can always find time, if he really wants to, to give brief answers to the relatively few questions asked. When circumstances demand an extensive review of case records, a preliminary answer can be given, and a more detailed report sent later. Where time is plenty and experience scant, none the less the answers should be sent in promptly. It is entirely possible that the data obtained from a careful study of a few cases may furnish information lacking in the returns from a more hasty survey of a larger mass of material.

It is probable that all of the oculists in the country did not receive letters, but there is no doubt that the committee would be glad to receive data from every source. The information acquired and the conclusions drawn therefrom will be at the service of the entire profession; and each member thereof should do what he can to aid the committee.

For the benefit of those who did not happen to receive a letter, but who desire, nevertheless, to help, the questions asked are reproduced:

(1) What local anesthetics do you use at present, and in what strength?

(2) Do you use one local anesthetic for all classes of cases? If not, give particulars.

(3) What special reasons have you for your preference as to the local anesthetic, strength and cases?

(4) Have you abandoned or decreased the use of any anesthetic that you have tried? Give reasons.

(5) Name and state briefly your experience as to the following points for all the local anesthetics which you have tried. (Where more than one anesthetic has been used extensively, explain each in detail). (a) Strength or concentration for superficial anesthesia, (b) for deep anesthesia, (c) time of onset and duration in both cases, (d) degree of irritation both cases, (e) effect on vascularity, (f) effect on pupils, (g) effect on accommodation, (h) effect on corneal epithelium, (i) effect on intraocular tension, (1) normal, (2) glaucoma, (j) occurrence of systemic intoxication, (k) stability of the solution including effect of sterilization by boiling, (1) effect of addition of epinephrin on intensity of anesthesia, and duration of anesthesia.

The answers are to be sent to Dr. Albert E. Bulson, Jr., 406 W. Berry St., Ft. Wayne, Indiana.

There are few questions which more vitally concern the oculist than that of the choice of an anesthetic which shall be at the same time efficacious, safe, reasonably swift in its effect and constant in its action. It is difficult to say which of these four factors is the most important. Safety is almost imperative, and yet if the danger is as slight as it is in cocaine, for example, it can be neglected, and the drug chosen in preference to one which is entirely harmless, but which is inconstant in its action. If we cannot depend on the anesthetic quality of the drug, or if it is sometimes swift and sometimes slow, it would better be discarded in favor of one which is more reliable.

These points are embodied either directly or indirectly in the questions given above, as well as others of greater or less importance. It is to be

hoped that the replies will be so numerous that the Committee will be able to make a comprehensive report in the near future. If you have not answered your letter, *do it now*. C. L.

### RELATION OF OPHTHALMOLOGIST TO DISPENSING OPTICIAN. THE COMMISSION EVIL

Years and years ago when ophthalmology was young, our professional fathers thought little of the routine work of measuring the ocular refraction, and were not at all disposed to dispense spectacles; they wanted to be known as eye surgeons. Thus in England they referred people whose eye symptoms called for correcting lenses, to a member of the "Worshipful Company of Spectacle Makers."

Forty years or more ago, thru the work of Donders, Landolt, Cuignet, Burnett, and many others, an impetus was given to the study of the refraction of the eye. A little later an influx of writing came, in which some of our present readers participated, resulting in the wide spread of this knowledge, so that now a very large part of the oculist's work consists in the measuring of eyes for glasses. Endeavors have been made to restrict this work to properly qualified medical men, but it didn't go! The spectacle sellers have flourished, until now there are as many as there are of oculists.

It is an axiom that a professional man is a brain worker, that he is paid in fees for such work, and that he is not to be classed with those who make their living by selling goods. There is no law against the doctor being a purveyor, in fact in sparsely settled communities, he must dispense his own medicines, dressings and all apparatus needed for help to his patient, and by rights he makes a charge for such materials; some do so at cost and some at a profit.

The oculist of the small town must do the same. He may carry a lot of stock lenses and fittings, sending his compound prescriptions to a wholesale or manufacturing optician by mail,



making a charge for his professional fee, and an additional charge for the glasses. This is a perfectly correct procedure and under such circumstances must be continued.

The ophthalmologist of the larger city has the choice of dispensing the product of his work in a similar manner, and there is no special objection to this, altho it is not to the advantage of any of the parties concerned. He usually does this for business reasons, to make a profit on the sale of the glasses to his patient, in addition to his professional fee. His customer is not imposed upon for he could get the glasses no cheaper from the retail optician. But in a way it is a waste of the surgeon's time; and really it is not as profitable as it may seem, for at the best the profit from lenses can hardly be more than one or two hundred dollars a month.

The other choice is to restrict the business to his examination, prescription and supervision, only charging a fee for his professional work.

Let us show you that this method is the really professional one, and that it is not only better for the patient but also the best for the oculist from the business standpoint. In a large city the oculist has a choice of anywhere from one to dozens of skilled spectacle frame fitters, whose time is less valuable than his own, who can afford to fiddle away a while with a particular patient in adjusting the frames, and who are satisfied with the average profit they make in the sale. They too are specialists and under the guidance of the medical man usually fit the frames better than can the surgeon.

True it is that a class of "refracting" opticians ("save the mark," and excuse the bending or crooking—for to refract means to bend) has grown up; and some of them do creditable rule of thumb work. But there are also nearly pure dispensing opticians, who may be recommended. Now if the oculist will work with the optician, doing the head work and allowing him the mechanical side, the whole job will cost no more to the patient, and the work will be better done.

From the business side of the question, the ophthalmologist, who does not dispense glasses, benefits by patients referred by the optician,—in a money sense to a greater extent than he would by taking the paltry profit from selling glasses to his patient; for only a few references a month will bring him more in fees. The optician is likewise trained that his province is to sell glasses, and not to measure eyes or to give advice, and he thus refers more cases to the oculist.

Now we come to a real abuse. This is *the receipt of commissions* from the optician, however disguised by other names. It is a common practice for a very large proportion of eye doctors, be they members of societies that interdict such procedure or not, to receive from a favored optician a monthly premium, bonus, stipend, dividend or commission, depending upon the amount of business sent in. This has grown so common that it is almost an accepted custom in many localities, particularly west of the Mississippi. None of the men who do this care to discuss the matter, none of them let their patients know of this extra commercial profit, none are proud of the procedure, but they take the money all the same.

Times have changed so some of them have lately seen the light, realizing that custom does not make right, and that this little graft is comparable to the reception of or giving of commissions of referred patients, or to collusion with the druggist in his profits. The business rule in professional work is that the patient should know for what he pays, and where his money goes. Any other way isn't done, you know, amongst the men we look up to in professional life. While not against the laws of the land or written ethics, it is bad form at least. Can't you see that the patient not only trusts you with his health but also in a measure with his pocket book, and that he should not be compelled to pay two profits for one purchase? The cost of the eye doctor's commission is always added to the cost of the glasses if business is done in this way, and of this the purchaser may not be aware.

If we can appeal in no other way to the secret profit taking members of our profession than from the business side, we must by showing them that they are not only losing face but money too thereby. If they will restrict their sales to the products of their brains, a better feeling will arise between the merchant of optical goods and the professional man; and the optician will refer more or all of the cases applying to him, to those physicians doing straight professional work.

H. V. W.

### WHICH ARE OUR BEST PAPERS?

Good ophthalmic literature should arouse and hold the reader's interest, and it should meet his needs. As to what are the most important needs of our readers in the direction of literature relating to ophthalmology, there is some opportunity for difference of opinion, and academic discussion. But in that discussion the reader himself should have the first hearing. Even tho he be not widely acquainted with the literature of his specialty, or skilled in writing, or in criticism, his idea of what he needs must be the starting point and basis of any such discussion. He is at least as likely to know what he needs as anyone else; and when it comes to stating what arouses and holds his interest the reader is the only authority.

We wish the papers published in this journal to conform to the above definition of good ophthalmic literature. No editor and no editorial board can secure this without an expression on the part of readers, as to what interests them and meets their needs; and this expression should represent the ideas of as many readers as possible, and come from the most widely differing points of view.

We must ascertain the needs of the man who has read little of the literature of ophthalmology, as well as those of the man who has read much; the man whose interest is in the practice, as well as the man whose interest is in the science; the man who is striving to manage ordinary cases, as

well as the man who is seeking to study an unusual condition; the one who likes to operate, and the one who does not; or we shall fail to get the best light on the kinds of papers that ought to be published in this journal.

Will you not help by answering the questions: What papers are most interesting? What papers best meet your needs? We will not publish what you write without your express permission. We hope the replies will be too numerous to publish more than a few of them. We do not want finished essays on what our journal should contain. But tell what interests you, what helps you. Name three papers published in this volume that you think are best, and the one that you think carries least value for the space it occupies. Give briefly your reasons and any clear strong thought you have on this subject.

Every member of a profession ought to desire to improve its literature. Here is a way that each can contribute something in that direction. Whatever this collective investigation yields will be worked up and reported, so that it can be discussed and utilized for the general good. Editors and writers need to be made conscious of the impressions of readers. Readers would often like the chance to criticize, or talk back. This is your opportunity.

E. J.

### BOOK NOTICES.

**Contributions to Medical and Biological Research. Dedicated to Sir William Osler, in Honor of his Seventieth Birthday, July 12, 1919. By his Pupils and Co-Workers. 2 volumes; illustrated, pp. XL-1268. Paul B. Hoeber, New York, 1919. Published by subscription only.**

After many delays, due to printing trade difficulties, this important work has finally been distributed, reaching the much beloved and widely mourned physician for whom it was prepared only a few days before his death. Ophthalmology was well represented on the Publication Committee of 18 British and American medical men, by

Drs. George E. de Schweinitz and Casey A. Wood, the latter acting as Secretary. Altho all the contributions are of interest to the ophthalmologist and should be read by him, certain of the papers especially demand his attention.

The first of these is J. George Adami's communication on the problem of graduate medical study in London—an attempt to point out how the wealth of clinical and other teaching material of the metropolis can be made available to English speaking (and thinking) students. Adami believes that the "only students who have thus far been completely satisfied with their graduate work in London are those who have confined themselves to a single specialty, or to the work and opportunities afforded by a single hospital." He instances the experience of students of ophthalmology, who are uniformly enthusiastic over the facilities extended by Moorfields; of the Great Ormond Street hospital for pediatrics, and for neurologists by the hospital in Queen Square. In the same way, physicians and surgeons placing themselves under a few of the teaching staff in some one of the great general hospitals have been entirely satisfied with the result.

It is useless, as has been demonstrated in the past, to urge attendance upon the weekly curriculum of lectures and demonstrations at the various London hospitals, until these have been thoroly organized as to time and place, so that it will be possible for the student to be present at widely separated clinics at different hours of the day. Happily such readjustment of schedules has taken place, and the special student may now spend the whole day at various hospitals in the pursuit of some particular line of medical or surgical study.

A research in the history of medicine, exemplified by Raymond Crawford's "Antoninus Musa; His Practice and Patients," is well worth the attention of students of early ophthalmic literature. In 22 B. C. he was the successful court physician of Augustus Cæsar, and the author of at least

two treatises, one of which was on the Fox-tail, Betomy of Linnæus (*Betonica alepocurus*), a plant in the period extensively employed in diseases of the eye. In the tractate, "De Herba Vetonica," its internal employment especially is extolled as an almost infallible remedy for forty-seven diseases, the second, third, fourth, and fifth being, respectively, "painful eyes," "headache," "dimness of vision," and "watery eyes."

In the second treatise, on the prevention of disease and the preservation of health, Musa contends for many of the precautions ordinarily found in present day treatises on hygiene; and it is a question whether a modern sanitarian could greatly better the rules laid down in this small treatise.

James M. Anders studies "Myxedema and Cretinism in the United States and Canada," and discusses their eye symptoms in tabular form, easily accessible to the student.

George Dock's "Oxycephaly and Exophthalmos" is almost a purely ophthalmic contribution, which should be read in its entirety by the specialist in eye diseases. The ocular signs (especially the optic neuritis and atrophy) with the "causes of blindness," as well as the intracranial conditions that are involved in these are fully discussed. Dock reminds us that slight attention was at first given to Friedenwald's suggestion that increased cerebral pressure being the main cause of the loss of sight, it should be met by a decompression operation. The reason for this lay in the fact that a large number of cases of pronounced oxycephaly were not accompanied by optic nerve disease, and in still fewer was papilledema demonstrated. Now, however, increased intracranial pressure should always be suspected, and when demonstrated should be dealt with accordingly.

Harry Friedenwald's contribution to the "Visual Disturbances in Polycythemia Vera" quotes Osler as the first one (in 1903) to examine and report upon the condition of the eye grounds in this rather rare disease, altho Lucas collected (1912) reports of 189 cases

of which eye signs were present in 30 per cent, and an ophthalmoscopic examination was made in twenty-six instances. This roster includes the remarkable case reported by Parker and Slocum, but does not, of course, record Christian's series of cases (1917) in practically all of which visual disturbances occurred. If there is one lesson to be learned from Friedenwald's paper it is the wisdom of using the ophthalmoscope in every case of disturbance of sight, however trifling it may seem.

The ophthalmologist may read with much benefit Arthur Hurst's "What the War has Taught us about Hysteria," if for no other reason than that a discussion of the ocular manifestations of that puzzling condition forms a considerable part of his contribution. He contends that "hysteria is a condition in which symptoms are present which have been produced by suggestion and are curable by psychotherapy." He follows this definition by the statement that the investigations of Babinski have shown the fallacy of a belief in the *stigmata* of hysteria. That, for example, the anesthesia supposed to be characteristic of hysteria is merely the result of unconscious suggestion on the part of the observer; further, that the constricted field of vision (one of Charcot's chief *stigmata*) does not exist, if one searches for it by means that do not suggest it as the perimeter does. The same observation is made of the "inward spiral" field, as demonstrated both by Symns and the writer. This essay, however, must be read in its entirety to be appreciated.

Fritz B. Talbot contributes a paper of interest to the ophthalmic surgeon, "Aneurysm of the Middle Cerebral Artery in a Child," in which there was pin-point contraction of the right pupil; and left sided mydriasis. Apparently, there were no visual disturbances.

A. S. Warthin's contribution—"A Case of Ayerza's Disease"—might well be read in conjunction with Harry Friedenwald's paper. The author claims priority for Ayerza, over Vas-

quez and Osler in the description of at least one type of Polycythemia. In Spanish-American literature Abel Ayerza of Buenos Aires is recognized as having described in a clinical lecture delivered in 1901, the syndrome (*cardiacos negros*) of chronic cyanosis, dyspnea, erythemia and pulmonary sclerosis.

Of several neurologic contributions having especial ophthalmic interest there is only room here for a passing notice of William G. Spiller's "Cerebral Monoplegia." Attention is drawn to the history (p. 1182) of a case in which the ocular signs were of importance—viz: an early unilateral papilledema. At the writer's request, Dr. A. C. Wood exposed the left motor parietal region and a small tumor was found in the center of the upper limb.

Edward Jackson's "Chronic Tuberculosis of the Choroid," finely illustrated by a colored drawing of the fundus oculi, is an admirable contribution to the subject, based on the continued observations of a case extending over a period of eight years, thus constituting a record of particular value in an affection that is commonly supposed to run an acute, rather than a long-drawn-out course. The interesting and instructive story of the first lesion (macular), of the first relapse and of the later activity, as shown by the ophthalmoscope, should be read to be appreciated.

A second contribution to the history of ophthalmology is a paper by the late Mortimer Frank on the "Schematic Drawing of the Eye," especially of those anatomic figures that appeared in the fifteenth and sixteenth centuries. Sudhoff found an anonymous *Anatomia oculi* on the back page of a thirteenth century MS., from the Sloan's collection in the British Museum, in which, with several fallacies, some of our modern discoveries (?) are distinctly pictured. From this date onward Frank chronicles and describes the various ocular maps, to the days of Georg Bartisch (1583) and his well-known drawings. The whole es-



say is of great interest to the serious student.

John E. Weeks has a well illustrated and practical paper on a "Minute Intraocular Sarcoma" requiring removal of the eyeball, together with the histologic findings. The author believes this tumor to be the smallest of its kind reported in ophthalmic literature, and he had an opportunity to watch its growth from the earliest beginnings. The clinical history comprises not merely the symptoms, but perimetric measurements, pencil drawings, and ophthalmoscopic findings, ending in an illustrated postmortem examination, all of which constitute an unusual and most instructive series of observations.

That the subtitle relating to "biological research" of these volumes might be represented in an ophthalmic sense, Casey A. Wood contributed a paper on the "Eyes of the Burrowing Owl," in which the fundus is illustrated by a colored drawing that shows the orange-red color, so characteristic, not alone of owls, but of nocturnal vertebrates generally.

It was the avowed intention of the Committee to produce volumes that would appeal to bibliophiles as examples of unusually fine book-making; and altho the exigencies of the World war largely prevented the accomplishment of the scheme, yet in paper, print, initial letters, frontispiece and binding they are not unworthy of the master they were intended to honor.

C. A. W.

**Transactions of the Ophthalmological Society of the United Kingdom.** Vol. 39, 475 pages. Illustrated. London, J. and A. Churchill.

This volume contains the papers presented at the annual session in May, 1919, with the rules of the Society, the list of its members and officers, the reports of the latter, and of its Council, the business body of the organization. These occupy about two-thirds of its pages. The remainder are given to scientific papers and discussions before its affiliated societies. These are the

Oxford Ophthalmological Congress, The Midland Ophthalmological Society, The Irish Ophthalmological Society, and the Ophthalmological Society of Egypt, the fifth affiliated society, that of the North of England, not being represented in this volume. The illustrations include 10 plates of which two representing chorio-retinitis and avulsion of the optic nerve are in colors; and there are 31 figures in the text.

The war volumes of this series showed some reduction in size, and in the quality of paper and printing; but in the present volume the prewar standard has been largely regained. In the number and scientific value of its papers this volume compares favorably with any of its predecessors. There is no marked difference in quality between the communications made to the main society and those made to the affiliated organizations.

The Bowman Lecture, by Victor Morax of Paris, upon Plastic Operations, and the Doyne Memorial Lecture on Preventive Ophthalmology by J. Herbert Parsons, are the most extended and formal communications. The discussions on the "Visual Requirements of Aviators," and on "Eye-sight in connection with Education," are each based on three opening papers, and are of great value. But the shorter individual papers and reports of which there are more than fifty, give the peculiar character and value of these transactions. Many of these are very brief, less than a page; but they are all worth while. The volume should be owned and read by every English speaking ophthalmologist.

E. J.

**Swanzy's Handbook of the Diseases of the Eye and Their Treatment.** Edited by Louis Werner. Twelfth Edition. 690 pages, 273 illustrations in the text and 9 colors plates. Philadelphia, P. Blakiston's Son and Company. Price \$6.00.

The great general works on ophthalmology in the English language have all been of gradual development.

They have passed thru many editions, keeping up with the progress of ophthalmic science, filling in gaps in the presentation of it, pruning away the least valuable matter; and finally attaining a uniformly high literary quality, as well as a massive quantity of information of the greatest value to the ophthalmologist. This work has thus earned its place in the front rank of ophthalmic text books. The original author carried it thru nine editions. Then he received the assistance of Werner. Since Sir Henry Swanzy's death, two editions have been brought out by his successor.

It is a larger book than at first appears. The paper on which it is printed, tho of excellent quality, is thin as compared with that used in many other books of its class. The blank margin is much narrower; and a large part of the work is printed in quite small type, which gives as much text to the page as we find in the larger works. Then the illustrations, altho clear and sufficient, occupy less space in this work than in some others. So that this book, altho not the largest book in the class of systematic general treatises on ophthalmology, ranks with the largest of them.

Of the general soundness and clearness of its teaching, nothing need be said, since a generation of ophthalmologists has passed favorable judgment upon it as regards these qualities. The principal changes found in the present edition, are a rearrangement and reclassification of diseases of the cornea, with recognition of some of the recent work in this department including Kuhnt's conjunctival flaps and Magitot's transplantation—"deferred keratoplasty." There is an account of the etiologic diagnosis of uveitis, and the most recent work on cortical visual centres, and the localization of foreign bodies. The present edition will hold the high esteem won by its predecessors as a work which so well combines fundamental science with practical clinical art

E. J.

## CORRESPONDENCE.

### Leucosis Retinae

*To the Editor:*

The article of Drs. R. C. Smith and Thos. Hall Shastid in the February number of the *JOURNAL* prompts me to write a few remarks as to the term "Aphykia Retinae." First and most essential is the supposition that the pigment of the 10th retinal layer has been absorbed. How can this be proven? "By the extreme visibility of the choroidal vessels?" But we find normally all degrees of visibility of these vessels, from the condition, where none are visible to where they are well visible.

I like to state that the transparency of the coats of the eye is very variable. In the heyday of transillumination some observations were published, where by putting the lamp at the equator bulbi the iris would show rather reddish. This condition can be found quite often if looked for. Within the last six months I have seen about half a dozen cases where the iris could be found transilluminated by putting the electric light at the equator bulbi. Two such patients I have shown at meetings of the Buffalo Ophthalmological Club. Such cases show that the pigment of the retina must also be more permeable for light than normally. The condition has nothing to do with Albinism, as Fuchs supposed. When this condition can be demonstrated to exist in the anterior half of the bulb it can be expected also for the posterior half. The name *LEUCOSIS RETINAE* has been suggested, and appeals to me much more than *Aphykia*, which reminds one too much of *Aphakia*.

It is rather disconcerting to find that many writers consider the retinal pigment layer as belonging to the choroid. I believe this to be the effect of the French school of Ophthalmology, which is expressed profusely in the *Encyclopédie d'Ophthalmologie*. I fully agree with the writers of the article that the pigment layer belongs to the retina, and should not be counted as part of the choroid.

It is an unproven assumption that "wearing of spectacles . . . stimulate the formation of visual purple." The last sentence "When the retina is transparent, it is only because the outermost layer of that structure, the pigmentary layer has been *absorbed*" (*italics mine*) gives rise to much opposition as every healthy retina except the outer layer, is transparent, invisible, under ordinary circumstances of examination and illumination. Only when we change the light, as Vogt has done with his red-free illumination, becomes the retina visible.

E. E. Blaauw,

Buffalo, N. Y.

### BIOGRAPHIC SKETCHES.

T. H. SHASTID,

SUPERIOR, WISCONSIN.

JACOB DENNIS ARNOLD, an eminent San Francisco ophthalmologist and oto-laryngologist, founder of the San Francisco Polyclinic, was born at Baltimore in 1855, and was graduated from Georgetown College in 1871. Three years later he received the M. D. at Washington University, Baltimore, being, it is said, the youngest graduate of the college up to that time. He then went to Europe, where he studied the eye, ear, nose and throat for several years.

Returning to Baltimore, he practiced in that city for a time, but, in 1884, having married, he removed to San Francisco, where he practiced as ophthalmologist and oto-laryngologist until his death. After he founded the Polyclinic, Dr. Arnold devoted the most of his time to its welfare. He was, for a very long time, the president of this institution, as well as the professor of diseases of the eye, ear, nose and throat therein. For several years he spent his summers in Alaska, and there was stricken with the disease which caused his death—carcinoma of the pancreas. He died at his home in San Francisco, September 26, 1919. Besides his widow, he is survived by two sons and two daughters.

BENJAMIN FRANKLIN CHURCH, a prominent California ophthalmologist, was formerly dean of the faculty and professor of ophthalmology and otology in the College of Physicians and Surgeons, Los Angeles. Born in 1858, he received his medical degree at the College of Physicians and Surgeons, Baltimore, in 1888. At just what time Dr. Church began to limit his practice, or when he removed to California, could not be learned. He was once president of the Travis County and Kaufman County (Texas) Medical Societies, and president of the Los Angeles Academy of Medicine. In 1917 he was chairman of the eye, ear, nose and throat section of the Medical Society of the State of California. He had been under treatment for mental troubles for about eight months, when he leaped from a window on the tenth floor of an office building, September 2, 1919, dying instantly.

WARWICK MILLER COWGILL, a well known ophthalmologist of Lincoln, Nebraska, was born at "Elmwood," Fulton county, Kentucky, April 3, 1857, son of Mary Miller and Nathaniel Newlin, Cowgill. He graduated at Kenyon College, Gambier, Ohio, in 1881; and at the Medical Department of the University of Louisville, Ky., in 1883. He proceeded at once to New York, where he studied in the Manhattan Eye, Ear, Nose and Throat Hospital, and the Ophthalmic and Aural Institute. For eighteen years he practiced the eye, ear, nose and throat at Paducah, Ky., and, for the rest of his life, at Lincoln, Neb. He was ophthalmic and aural surgeon to the Louisville and Memphis Division of the Illinois Central Railroad. He married on October 27, 1886, Alice Blake Parker, by whom he had two children. He died at Lincoln, Nebraska, December 29, 1919.

CHRISTIAN RASTUS HOLMES, a famous American ophthalmologist, was born at Veile, Denmark, October 18, 1857, son of Christian R. and Karen Mickelsen, Holmes. He received an elementary education in his native country and a fairly comprehensive course in civil

engineering in Germany. On the death of his father he brought his mother to America, and the two lived for a time at Syracuse, N. Y., and later at Vin-

asant by Dr. Joseph Aub. One year later, Dr. Aub died, and the greater portion of his practice fell to his former assistant.



Christian Rastus Holmes, 1857-1920

cennes, Ind. In both places he worked as a mechanical draughtsman. In 1886 he received the degree of M. D. at the Miami Medical College.

For a time he engaged in general practice, but soon was employed as as-

Dr. Holmes's rise to fame was rapid. He was an excellent operator, a fluent speaker, a man of immense executive ability. He was ophthalmologist and otologist to the Cincinnati Hospital from 1888-99; professor of otology at



the Miami Medical College from 1890 to 1904; professor of ophthalmology to the Laura Memorial Medical College and Presbyterian Hospital from 1892 to 1903; consulting ophthalmologist to the Cincinnati Hospital from 1908 until his death; a medical director of the Cincinnati General Hospital; advisory commissioner to the New Cincinnati General Hospital; and professor of otology in the College of Medicine of the University of Cincinnati from 1904 until his death.

From its inception he was dean of the Medical Department of the University of Cincinnati—a school which he founded by securing the merger in 1909 of the Ohio and Miami Medical Colleges. He was a member of the American Ophthalmological Society, American Otological Society, American Laryngological Society, a Fellow of the American College of Surgeons, President of the American Academy of Ophthalmology and Oto-laryngology, 1901-2; Vice President of the American Medical Association, 1902-3; and chairman of the section of laryngology and otology, 1904-5; Chairman of the section of ophthalmology, 1905-6; President of the American Laryngological, Rhinological and Otological Society, 1908-9. In 1917-18 he was a major, in charge of the eye, ear, nose and throat department, Base Hospital, Camp Sherman, Ohio. For eighteen months he worked almost continually. As a result, he was very much enfeebled, so that, at least indirectly, his work for the soldiers was, later, the cause of his own death.

Dr. Holmes was a man of medium size, inclined to stoutness, and of a somewhat ruddy complexion, with blue-gray eyes and dark brown hair. He was brisk, jolly, and sympathetic. He was a born leader, a great teacher.

The doctor married, on October 26, 1892, Miss Bettie Fleischmann, daughter of Charles Fleischmann, of Cincinnati. To the union were born three children—Carl F., Christian R. III, and Julius F.

Three months before his decease, Dr. Holmes was stricken with appendicitis, and, tho not in a condition

favorable to recovery, he was nevertheless obliged by the urgent symptoms of his case to submit to an operation. There developed sequellae, from which he ultimately died, at the Post-Graduate Hospital, in New York City, January 9, 1920.

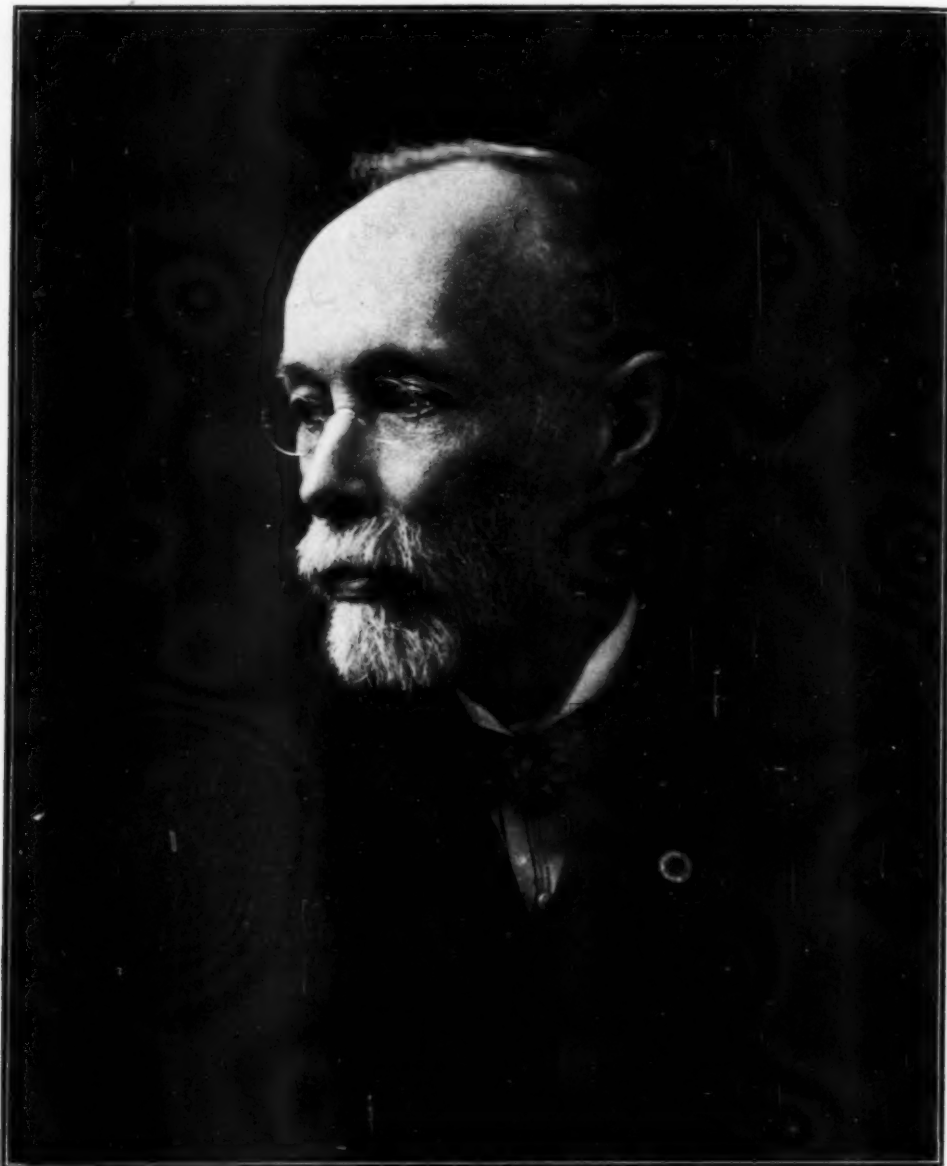
Of the very remarkable personality of Dr. Christian Holmes, there should be a fitting record. Said James A. Green, of Cincinnati: "He was a man of marvelous visions, which he promptly translated into facts." Said the Journal of the American Medical Association: "Dr. Holmes was an idealist and enthusiast, and worked with untiring energy, sacrificing health and fortune to the accomplishment of the great plans which he had conceived."

Dr. Holmes's contributions to medical literature are numerous. Among the more important we may mention the following: Modern Hospitals, with Special Reference to Our New Municipal Hospital and its Relation to Medical Education in Cincinnati (Cincinnati, 1908); Cincinnati General Hospital, Its History and Present Aspect (Modern Hosp., 1919, v. 13, p. 161); Extirpation of the Lachrymal Gland in Epiphora; Mastoid Cases at Camp Sherman; Daniel Drake's Memorial Address; The Relation of Pathological Changes in the Accessory Nasal Cavities to Diseases of the Eye. Shortly before his death, Dr. Holmes was engaged upon a book relating to the Accessory Nasal Sinuses and Their Pathologic Relations to the Eye, which was to have been a volume of the series known as "The International System of Ophthalmic Practice."

CHARLES MCINTIRE, a well known American ophthalmologist, long secretary of the American Academy of Medicine, was born in Philadelphia, August 30, 1847, son of Charles and Eliza (Cook) McIntire; he was descended on the maternal side from English, on the paternal, from Scotch-Irish and English-Quaker ancestry. He was graduated from the Easton High School in 1864, and received the degree of A. B. (*cum laude*) at Lafayette College in 1868, and that of A. M. in 1871. From 1868 to 1872 he was as-

sistant in chemistry at his alma mater, and adjunct professor from 1872 to 1874. His medical degree having been received at the University of Pennsyl-

In 1882 he was appointed lecturer on hygiene at Lafayette College, and from 1884 to 1888 was medical director of physical training at the same institu-



Charles McIntire, 1847-1920

vania in 1873, he engaged in general practice at Easton, Pa., and later restricted his practice to the eye, ear, nose and throat.

For a time he was medical inspector of the Pennsylvania State Board of Health. He was an associate member of the American Institute of

Mining Engineers from 1872 to 1878, of the American Chemical Society from 1876 to 1880; secretary of the Northampton County Medical Society from 1876 to 1898, and its president in 1899; secretary of the Lehigh Valley Medical Association for several years; associate secretary of the Pennsylvania State Medical Society in 1874 (became a permanent member of that body in 1876); associate secretary of the American Academy of Medicine from 1878 to 1889, secretary from 1890 to 1902, president from 1902 to 1903, again secretary from 1903 to 1915, and treasurer in 1915, associate member of the National Confederation of State Medical Examining and Licensing Boards in 1896, a Fellow of the American Medical Association, a member of the Phi Beta Kappa fraternity, and of the American Association for the Advancement of Science. In 1915, he resigned, because of failing health, his secretaryship of the American Academy of Medicine—a position he has filled with very remarkable patience and ability.

Dr. McIntire was a small, spare man, with a waxen complexion, light blue eyes, and thin, white hair. He wore as a rule, a full, close-cropped, beard. He was gentle and tactful in his manner, and a man of rare executive ability.

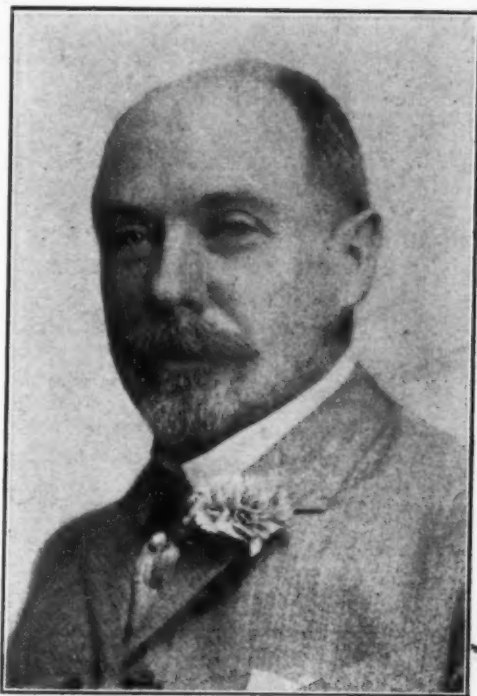
He married, May 19, 1881, Ella, daughter of Dr. Traill Green, of Easton, Penna. They had no children. About eight years ago Dr. McIntire fractured one of his legs, and later developed osteitis deformans, from which he died, January 4, 1920. He was a member of the First Presbyterian Church, of Easton, in which he had been a ruling elder for many years.

Dr. McIntire was a prolific contributor to chemical and medical journals, most of his articles dealing with hygiene, medical economics, and sociology. He was editor of the Lehigh Valley Medical Association Journal, and of the Bulletin of the American Academy of Medicine.

FRANCIS REBER MUSSER, an ophthalmologist of Oakland, Calif. Born in Pennsylvania in 1860, he received the medical degree at the University of

Pennsylvania in 1895. He seems to have settled soon afterward at Oakland as ophthalmologist and oto-laryngologist. His death occurred from paralysis at Oakland, August 26, 1919.

ARTHUR BRIGHAM NORTON, a well known homeopathic ophthalmologist of New York City, author of various books on homeopathic ophthalmology,



Arthur Brigham Norton, 1856-1919

and at one time editor of the Homeopathic Eye, Ear and Throat Journal. He was born at New Marlborough, Mass., September 15, 1856, the son of Salmon Kasson, and Sarah Jane (Brigham) Norton. His preliminary training was received at the New Marlborough Academy and the Great Barrington High School. He received the degree of M. D. from the New York Homeopathic Medical College and Hospital in 1881, and that of *Oculi et Auris Chirurgus* from the College of the New York Ophthalmic Hospital in 1882. He practiced in New York City.

Dr. Norton was Professor of Ophthalmology in the New York Homeopathic Medical College and Hospital from 1902

to 1907, and in the College of the New York Ophthalmic Hospital from 1882 to 1919. He was oculist to the Hahnemann and Laura Franklin Free Hospitals; surgeon to the New York Ophthalmic Hospital; a member of the American Institute of Homeopathy; the American Homeopathic Ophthalmological, Otological, and Laryngological Society and a Fellow of the American College of Surgeons. He contributed numerous articles to homeopathic publications, and also wrote "Ophthalmic Diseases and Therapeutics" (3d ed., 1901) and "Essentials of Diseases of the Eye" (1904).

Dr. Norton was a man of medium build, a fair complexion, and light blue eyes and brown hair. He wore as a rule a Van Dyke beard, and was always brisk and gay in manner. He was very much interested in hospital improvement.

He married, November 25, 1885, Leah Louise Pixley, by whom he had two children. His death occurred at New York City on June 18, 1919.

HENRY FOWLER STOWELL, a well-known ophthalmologist and otolaryngologist of Rochester, N. Y., was born at Hornell, N. Y., in 1848. His medical degree was received at the College of Physicians and Surgeons in the City of New York in 1877. He practiced for a time in New York City as a specialist in diseases of the eye, ear, nose and throat, and later opened an office in Rochester, retiring, however, some years ago. After his retirement, he took up the study of mechanical devices and received patents for many of his inventions, some of which are in practical use. Dr. Stowell died at the home of his daughter in Wayne, Penn., June 8, 1919.

## NEWS ITEMS

Personals and items of interest should be sent to Dr. Melville Black, 424 Metropolitan Building, Denver, Colorado. They should be sent in by the 25th of the month. The following gentlemen have consented to supply the news from their respective sections: Dr. Edmond E. Blaauw, Buffalo; Dr. H. Alexander Brown, San Francisco; Dr. V. A. Chapman, Milwaukee; Dr. Robert Fagin, Memphis; Dr. M. Feingold, New Orleans; Dr. Wm. F. Hardy, St. Louis; Dr. Geo. F. Keiper, LaFayette, Indiana; Dr. Geo. H. Kress, Los Angeles; Dr. W. H. Lowell, Boston; Dr. Pacheco Luna, Guatemala City, Central America; Dr. Wm. R. Murray, Minneapolis; Dr. G. Oram Ring, Philadelphia; Dr. Chas. P. Small, Chicago; Dr. John E. Virden, New York City; Dr. John O. McReynolds, Dallas, Texas; Dr. Edward F. Parker, Charleston, S. C.; Dr. Joseph C. McCool, Portland, Oregon; Dr. Richard C. Smith, Superior, Wis.; Dr. J. W. Kimberlin, Kansas City, Mo. Volunteers are needed in other localities.

### DEATHS.

Dr. William King Rogers, Columbus, aged fifty-three, died February 27th, from septicemia.

Dr. Gustav Adolph Thiede, Baltimore, aged forty-seven, died February 16th.

Dr. F. T. Reyling, Kansas City, died February 24th, 1920, of pneumonia. Dr. Reyling graduated at the University of New York in 1884 and was later Assistant Professor of Pathology and Visiting Surgeon at the Manhattan Eye and Ear Infirmary. He came to Kansas City in 1897 and practised his specialty, ophthalmology, there until his death.

### PERSONALS.

Dr. J. Norman Risley of New Bedford, Massachusetts, announces John Norman Risley, Junior, born March second.

Dr. John E. Weeks of New York has retired as an Active Surgeon of the New York Eye and Ear Infirmary, and has been made Consulting Surgeon.

As a result of the competitive examination recently held by the Cook County Civil Service Commission, Drs. E. Findlay, G. F. Suker, and C. G. Darling received appointments as ophthalmologists on the staff of Cook County Hospital, Chicago.

Dr. E. Fuchs, formerly of Vienna, Austria, is now residing in Madrid, Spain, where he went on invitation of the "Junta de Ampliacion de Estudios" to deliver a course of lectures on Ocular Pathology. These lectures will be supplemented with explanations by Dr. Cajal.

Dr. George F. Keiper, of Lafayette, Indiana, has suffered the loss of his wife, Mary Lloyd Keiper, who died at her home recently of an incurable malady from which she has been seriously ill for several months.

Dr. Luther C. Peter of Philadelphia has been honored by the Council of the Oxford Congress with an invitation to open the discussion which will be held this year, on "Perimetric Methods." The Congress will



take place in Keble College, Oxford, on July 14-15-16. Dr. Peter expects to sail the latter part of June.

## SOCIETIES.

The eighth annual meeting of the Pacific Coast Oto-Ophthalmological Society will be held in Portland, Oregon, during the week beginning July 26th, 1920.

At the annual meeting of the Milwaukee Oto-Ophthalmic Society, February 6th, Dr. Gustavus I. Hogue was elected president; Dr. Richard J. Muenzner, vice-president, and Dr. John E. Guy, Secretary.

Dr. Meyer Wiener, St. Louis, presented a paper on "Epithelial Inlay in Restoration of the Socket" at the February meeting of the Kansas City Eye, Ear, Nose and Throat Club. This was an all day clinical meeting.

At the March meeting of the Kansas City Eye, Ear, Nose and Throat Club, papers were presented by Drs. E. M. Seydell and J. G. Dorsey of Wichita, and Dr. J. H. Laning of Kansas City.

Dr. Arthur J. Bedell of Albany is Chairman of eye, ear, nose and throat section of the Medical Society of the State of New York, which held its one hundred and fourteenth annual meeting in New York City, on March 22nd.

At the annual meeting of the Portland Ophthalmological and Oto-laryngological Society the following officers were elected for the ensuing year: President, Dr. J. F. Beaumont, Portland; first vice-president, Dr. S. E. Wright, Portland; second vice-president, Dr. R. E. Fenton, Portland; secretary-treasurer, Dr. C. Gertrude French, The Dalles, Portland.

At the March meeting of the Chicago Ophthalmological Society papers were read by Dr. G. W. Mahoney on "Some Indications for Evisceration"; Dr. Harry Woodruff, on "Enucleation and Its Substitutes for Cosmetic Effect"; and Dr. E. F. Snyder, on "Plastic Corrections in Slight Ectropion to Retain Glass Eye."

At the February meeting of the Section on Ophthalmology of the New York Academy of Medicine, a very instructive evening was spent in the study of Wood Alcohol poisoning with special reference to the eyes. The subject was handled by Colman W. Cutler, Charles Norris, Professor Charles Baskerville and Professor Joseph P. Chamberlain.

At the March meeting, the physiologic properties of the lens and their application in measuring refraction was presented by Walter B. Lancaster of Boston, and "The Optics of the Cornea," by G. W. Vandegrift.

## MISCELLANEOUS.

We made an error last month in stating that the Archives d'Ophthalmologie had been discontinued during the period of the war. This journal appeared regularly.

As a result of the campaign being carried on by the Illinois Society for the Prevention of Blindness, two Chicago midwives were recently made to pay fines of \$25.00 and \$15.00 for neglecting to use nitrat of silver in the eyes of new born babies.

A free diagnostic clinic has been established in Buffalo, designed primarily for the use of physicians' pay patients, who cannot afford the customary consultation fee. No treatment will be given. Dr. E. G. Starr has been appointed ophthalmologist on the staff.

An Associated Press dispatch, dated last December, mentions a new concave screen that gives depth to the picture, and relieves eye strain. Dr. Louis Pech of the University of Montpellier, France, the inventor, supervised the exhibition in this country. Dr. Pech believes the relief from eye strain is due to the normal functioning of the eye when it sees things of three dimensions, even if the appearance of the third dimension is illusion.

# OPHTHALMIC LITERATURE

These lists contain the titles of all papers bearing on Ophthalmology received within the preceding month. These titles are all in English, some of them modified to indicate more clearly their subjects. These subjects are grouped under appropriate heads the succession of groups being the same from month to month. In the group the papers are arranged alphabetically usually by the name of the author in heavy-face type. After the subject of the paper (Ill.) indicates the number of illustrations. (Pl.) the number of plates, and (Col. pl.) colored plates illustrating the article. (Abst.) shows that it is an abstract of the original article. (Bibl.) tells that the paper is accompanied by an important bibliography. (Dis.) means that discussion of the subject is published with it. Under Repeated Titles are indicated additional publication of papers already noticed. To secure the earliest possible notice writers may send copies of their papers, or reprints, to 318 Majestic Bldg., Denver, Colo.

## DIAGNOSIS.

- Baslini, C.** Simple Corneal Microscope. *Osp. Maggiore*, v. 7, p. 73.
- Clarke, E.** Vision of Aviators. *Tr. Ophth. Soc. United Kingdom*, v. 39, p. 54.
- Dimitry, T. J.** Examination of Eyes as Factor in Diagnosis. *New Orleans Med. and Surg. Jour.*, Feb., 1920.
- Duverger, C., and Barré, J. A.** Arterial Retinal Tension. (2 ill.) *Arch. d'Opht.*, v. 36, pp. 71-88.
- Examination of Eyes as Factor in Diagnosis. *New York Med. Jour.*, v. 111, p. 378.
- Hay, P. J.** New Test Types Including Colored Test Types and Their Application to Toxic Amblyopia. (1 chart.) *Tr. Ophth. Soc. United Kingdom*, v. 39, pp. 240-246.
- Kern, v. B.** New Test Chart. *Berl. klin. Woch.*, v. 56, p. 1002.
- Koby, E. E.** Ophthalmoscopy of Normal Eye with Light Devoid of Red Rays. (1 col. pl.) *Rev. Gen. d'Opht.*, v. 34, pp. 6-16.
- Smith, H. E.** Relationship of Ophthalmology to Group Diagnosis. *New York Med. Jour.*, v. 111, pp. 357-358.
- Velter, E.** Measurement of Arterial Tension. *Arch. d'Opht.*, v. 36, pp. 88-95.

## THERAPEUTICS.

- Netto, C.** Heat in Ocular Therapeutics. *Arch. Brazil de Méd.*, v. 9, p. 504.
- Roberts, B. H. St. C.** Sera and Vaccines in Eye Work. *Tr. Ophth. Soc. United Kingdom*, v. 39, pp. 361-366.
- Urra, F. M.** Prolonged Use of High Frequency Current in Ocular Disease. *Arch. de Oft. Hisp.-Amer.*, v. 19, p. 653.

## OPERATIONS.

- Guglianetti, L.** New Synechiotome. (2 ill.) *Arch. di Ottal.*, v. 26, pp. 235-240.
- Mayou, M. S.** Method of Iridectomy. *Brit. Jour. Ophth.*, v. 4, pp. 124-125.
- Weekers, L.** Amphitheatre for Ocular Surgery. (1 ill.) *Arch. d'Opht.*, v. 36, pp. 34-37.

## REFRACTION.

- Beckers, H.** Myopia. *Excerpta Med.*, v. 28, p. 225.
- Chattaway, F. D.** Optical Activity. *Science Prog.*, v. 14, p. 243.
- Clarke, E.** Presbyopia. (3 ill.) *Tr. Ophth. Soc. United Kingdom*, v. 39, pp. 246-258.

- Dinger, J. E.** Genesis of Myopia. *Graefe's Arch. f. Ophth.*, v. 100, Ht. 1-2. *Abst. Berl. klin. Woch.*, v. 56, p. 1028. *Wien. med. Woch.*, v. 48, p. 2362.
- Ellett, E. C.** Headaches Due to Eye Strain. *Jour. Tenn. State Med. Assn.*, v. 12, p. 382.
- Faber, O.** Ferraris' Dioptric Instruments, an Elementary Exposition of Gauss' Theory and its Application. *Brit. Jour. Ophth.*, v. 4, p. 140.
- Fehr, Testing for Eyeglasses.** *Therap. der Gegenwart*, v. 60, p. 377. *Abst. J. A. M. A.*, v. 74, p. 639.
- Haughey, I. W.** Practical Observations on Refraction. *Amer. Jour. Ophth.*, v. 3, p. 197.
- Lang, B. T.** Position and Amount of Astigmatism. *Brit. Jour. Ophth.*, v. 4, p. 126.
- Sharp, W. N.** Headaches due to Eye Strain. *Indianapolis Med. Jour.*, v. 23, p. 62.
- Sumner, P.** Refraction and Medicine. *California State Jour. Med.*, v. 18, pp. 78-82.
- Uthoff, W.** High Myopia and Ocular Muscle Paralysis. *Klin. M. f. Augenh.*, July-August. *Abst. Berl. klin. Woch.*, v. 56, p. 1027.
- Wibaut, F.** Refraction in Semidarkness. *Nederl. Tijdschr. v. Geneesk.*, v. 2, p. 1437. *Abst. Jour. A. M. A.*, v. 74, p. 708.

## OCULAR MOVEMENTS.

- Bilancioni and Manoia.** Spontaneous Nystagmus in Aviators. *Policlin.*, v. 26, p. 461. *Abst. Jour. A. M. A.*, v. 74, p. 565.
- Butler, T. H.** Stereoscopic Vision. *Tr. Ophth. Soc. United Kingdom*, v. 39, p. 52.
- Craig, J. A.** Case of Squint. *Tr. Ophth. Soc. United Kingdom*, v. 39, pp. 383-386.
- Davids, H.** Strabismus and Double Vision. *Klin. M. f. Augenh.*, v. 63, July-August. *Abst. Berl. klin. Woch.*, v. 56, p. 1027.
- Dusser de Barenne, J. G.** Caloric and Turning Nystagmus. *Nederl. Tijdschr. v. Geneesk.*, 1919, 1, p. 2243.
- Duverger and Mettey.** Advancement for Strabismus. *Médecine*, Paris, v. 1, p. 200.
- Griffith, C. R.** Effect of Repeated Rotation upon Nystagmus. *Laryngoscope*, v. 30, p. 22.
- Hoeve, van der, J.** Tonic Labyrinth Reflex of Eyes. *Arch. f. d. ges. Physiol.*, v. 159, pp. 1-81.

- Kirschmann, A.** Binocular and Stereoscopic Vision. *Psychol. Studien*, v. 10, pp. 239 and 381.
- Miners' Nystagmus.** *Brit. Jour. Ophth.*, v. 4, p. 129.
- Terrien, F.** Orthoptic Treatment of Strabismus without Instruments or Prisms. (4 ill.) *Arch. d'Opht.*, v. 36, pp. 37-42.
- Velter and Wiart.** Traumatic Bilateral External Ophthalmoplegia. *Rev. Neurol.*, 1919, No. 7. *Abst. Rev. Gen. d'Opht.*, v. 34, p. 47.
- Walter, W.** Heterophoria and Heterotropia. *Amer. Jour. Ophth.*, v. 3, p. 201.
- Weekers, L.** Alterations in Twilight Vision in Occupational Nystagmus. *Amer. Jour. Ophth.*, v. 3, p. 162.
- Werner, H.** Optical Rhythm. *Arch. f. d. Ges. Psychol.*, v. 38, p. 959.

## CONJUNCTIVA.

- Allan, J.** Treatment of Trachoma. *Prescriber, Edinb.*, v. 13, p. 172.
- Aubaret.** Purulent Ophthalmia in Adults. *Médecine, Paris*, v. 1, p. 202. *Abst. Jour. A. M. A.*, v. 74, p. 705.
- Trachoma at Marseilles. *Bull. de l'Acad. de Méd.*, v. 83, p. 75.
- Coover, D. H.** Tuberculosis of Conjunctiva. (1 col. pl.) *Amer. Jour. Ophth.*, v. 3, p. 206.
- Garcia Mansilla, D. S.** Treatment of Trachoma. *España Oft.*, v. 5, pp. 50-59.
- Huppenbauer, K.** Ocular Tuberculosis. *Int. Centralbl. f. die ges. Tuber. Forschung*, v. 13, p. 226.
- Karelus.** Morax-Axenfeld Conjunctivitis. *Przeglad Lek.*, 1918, No. 47.
- Mezincescu, D., and Holban, D.** Experimental Gonococcal Ophthalmia in Rabbit. *Compt. rend. Soc. Biol.*, v. 82, p. 536.
- Raynor, W. P.** Trachoma Increasing in Missouri. *Jour. Missouri State Med. Assn.*, v. 17, pp. 118-119, and 130.
- Solares, F. V.** Ophthalmia Neonatorum. *Arch. de Ginec. Obstet. y Ped.*, v. 32, p. 149. *Abst. Jour. A. M. A.*, v. 74, p. 769.

## CORNEA AND SCLERA.

- Bolten, G. C.** Blue Scleras and Brittle Bones. *Med. Weekbl.*, v. 26, pp. 289 and 301.
- Cantonnet, A.** Iodin Treatment of Corneal Ulcer. *Médecine, Paris*, v. 1, p. 214. *Abst. Jour. A. M. A.*, v. 74, p. 705.
- Interstitial Keratitis, Hutchinson Teeth and Hydrarthrosis. *Paris Méd.*, v. 9, p. 132. *Abst. Arch. d'Opht.*, v. 36, p. 126.
- Chenet.** Harvesters' Keratitis. *Médecine, Paris*, v. 1, p. 210. *Abst. Jour. Amer. Med. Assn.*, v. 74, p. 705.
- Delany, T. H.** Phlyctenular Disease with Peculiar Feature. *Tr. Ophth. Soc. United Kingdom*, v. 39, p. 377.
- Dinger, J. E.** Deep Corneoscleral Furrow and Emmetropia. *Klin. M. f. Augenh.*, v. 63, July-August. *Abst. Berl. klin. Woch.*, v. 56, p. 1027.
- Elschnig, A.** Blood Staining of Cornea. *Klin. M. f. Augenh.*, v. 63, July-August. *Abst. Berl. klin. Woch.*, v. 56, p. 1027.
- Fietta, P.** Tuberculoma of Sclera and Episclera. Geneva Thesis, 1919. *Abst. Arch. d'Opht.*, v. 36, p. 34.
- Giri, D. V.** Unusual Opacity of Cornea. *Tr. Ophth. Soc. United Kingdom*, v. 39, p. 154.
- Nutrition of Cornea, Nature and Function of Ciliary Processes in Corneal Ulcer. *Tr. Ophth. Soc. United Kingdom*, v. 39, pp. 145-154.
- Harris.** Destruction of Gasserian Ganglia by Alcohol Injection. *Lancet*, Feb. 21, 1920, p. 439.
- Maxwell, E.** Nodular Keratitis. *Tr. Ophth. Soc. United Kingdom*, v. 39, p. 376.
- Salus, R.** Rodent Ulcer of Cornea. *Klin. M. f. Augenh.*, v. 63, July-August. *Abst. Berl. klin. Woch.*, v. 56, p. 1027.
- Werner, L.** Conical Cornea. *Tr. Ophth. Soc. United Kingdom*, v. 39, p. 375.
- Wise, W. W.** Fragilitas Ossium and Blue Scleras. *Med. Press*, Jan. 14, 1920, p. 32.
- Wolff, C. K.** Relapsing Phlyctenular Keratitis in Children. *Lancet*, March 6, 1920, p. 509.

## ANTERIOR CHAMBER AND PUPIL.

- Georgopoulos, S.** Alternating Inequality of Pupil. *Gaz. des Hôp.*, v. 92, p. 620. *Abst. Arch. d'Opht.*, v. 36, p. 127.
- Okazaki, G.** Wassermann Reaction of Aqueous Humor. *Japan Med. World*, Jan. 3, 1920, p. 17. *Abst. J. A. M. A.*, v. 74, p. 631.
- Pollock, W. B. L.** Action of Hypophysin (Pituitrin) upon Pupil of Rabbit. *Brit. Jour. Ophth.*, v. 4, pp. 106-124.
- Spiller, W. G.** Oculo-pupillary Fibres of Sympathetic System. *Amer. Jour. Med. Sc.*, v. 159, pp. 325-336.
- Weve, H.** Light Reflex of Pupil. *Graefe's Arch. f. Ophth.*, v. 100, Ht. 1-2. *Abst. Berl. klin. Woch.*, v. 56, p. 1028.
- Ziegler, S. L.** Problem of Artificial Pupil. (5 ill.) *Tr. Ophth. Soc. United King.*, v. 39, pp. 316-329.

## UVEAL TRACT.

- Browning, S. H.** Radical Cure of Gonorrheal Iritis. *Brit. Jour. Ophth.*, v. 4, pp. 102-106.
- Crossley, E. R.** Eye Involvement After Focal Infection. *Illinois Med. Jour.*, v. 37, p. 187.
- Folman, M.** Etiology of Rheumatic Iritis. *Excerpta Med.*, v. 28, p. 193.
- McGuire, H. H.** Ocular Lesions Due to Focal Infection. *West Va. Med. Jour.*, v. 14, pp. 295-300.
- Mooney, H. C.** Central Choroiditis in Soldier. *Tr. Ophth. Soc. United Kingdom*, v. 39, p. 374.
- Shannon, J. R.** Causes, Diagnosis and Treatment of Iritis. *Albany Med. Ann.*, v. 41, pp. 37-41.

**Van Duyse.** Atypical Chorioretinal Coloboma. (2 ill.) Arch. d'Ophth., v. 36, pp. 22-34.

**Weekers, L.** Iridocyclitis Due to Lesion of Trigeminal. (1 ill.) Arch. d'Ophth., v. 36, pp. 95-103.

**Zotdzowski.** Detachment of Ciliary Body. Przegląd. Lekär., 1918. Abst. Arch. d'Ophth., v. 36, p. 37.

#### SYMPATHETIC DISEASE.

**Burckardi, K.** Sympathetic Ophthalmia after Enucleation of Eye. Rostock Thesis, 1917.

Repeated Titles. **Van Lint.** (v. 3, p. 156). Arch. d'Ophth., v. 36, 1919. Brit. Jour. Ophth., v. 4, pp. 128-129.

#### GLAUCOMA.

**Bailliant, P.** Blood Pressure in Branches of Central Retinal Artery by Bailliant Dynamometer. Tr. Ophth. Soc. United Kingdom, v. 39, pp. 329-335.

**Cantonnet, A.** Trephining in Glaucoma. Médecine, Paris, v. 1, p. 214.

**Colombo, G.** Iridociliary Entanglement in Sclerocorneal Trephining. Arch. di Ottal., March and August, 1918. Abst. Brit. Jour. Ophth., v. 4, p. 136.

**Hegner, C. A.** Trephining in Glaucoma. Klin. M. f. Augenh., v. 63, July-Aug. Berl. klin. Woch., v. 56, p. 1028.

**Herbert, H.** Future Glaucoma Operation. (2 ill.) Tr. Ophth. Soc. United King., v. 39, pp. 218-232.

**Lagrange, F.** Decompression Operation for Glaucoma. Arch. d'Ophth., v. 36, p. 117.

**Rohr.** Glaucoma in Relation to Exudative Diathesis. Münch. med. Woch., v. 66, p. 1266. Abst. Jour. A. M. A., v. 74, p. 638.

**Seddik, Z.** Late Infection after Trephining. Tr. Ophth. Soc. United Kingdom, v. 39, pp. 413-418.

**Werner, L.** Glaucoma and Cataract. Tr. Ophth. Soc. United Kingdom, v. 39, p. 374.

**Wölflin, E.** Irritation of Cervical Sympathetic. Graefe's Arch. f. Ophth., v. 100, Ht. 1-2. Berl. klin. Woch., v. 56, p. 1029.

**Young, G.** Double Sclerectomy. (1 ill.) Tr. Ophth. Soc. United Kingdom, v. 39, pp. 209-218.

Repeated Titles. **Morax** (1, p. 542). Brit. Jour. Ophth., v. 4, p. 135.

#### CRYSTALLINE LENS.

**Adams, W. H.** Medical and Surgical Treatment of Senile Cataract. Jour. Florida Med. Assn., v. 6, pp. 35-39.

**Butler, T. H.** Removal of Lens Dislocated into Vitreous. Tr. Ophth. Soc. United Kingdom, v. 39, pp. 358-361.

**Bywater, E. N.** Smith-Indian Cataract Operation. Southwestern Med., v. 4, pp. 6-10.

**Cantonnet, A.** Rare Luxation of Crystalline Lens. (2 ill.) Arch. d'Ophth., v. 36, pp. 103-106.

**Cortes, L.** Black Cataract. España Oftalm., v. 5, p. 64.

**Hoeve, van der, J.** Eye Lesions Produced by Light Rich in Ultraviolet Rays, Senile

Cataract and Degeneration of Retina. Amer. Jour. Ophth., v. 3, pp. 178-194.

**Killen, W. M.** Cataract Extraction with and without Intraocular Irrigation. Tr. Ophth. Soc. United Kingdom, v. 39, pp. 378-383.

**Oliveres.** Suture of Cornea in Cataract Extraction. Arch. de Oft. Hisp.-Amer., v. 19, pp. 670-675.

**Salterain, J. de.** Cure of Congenital Blindness. Rev. Med. d. Uruguay, v. 22, p. 523.

**Triebenstein, O.** Vossius Ring Formation. Klin. M. f. Augenh., v. 63, July-August. Berl. klin. Woch., v. 56, p. 1028.

**Vogt, A.** Form of Human Lens Nucleus. Graefe's Arch. f. Ophth., v. 100, Ht. 1-2. Berl. klin. Woch., v. 56, p. 1028.

#### VITREOUS.

**Hoeve, van der, J.** To Prevent Loss of Fluid Vitreous. Nederl. Tijdschr. v. Geneesk., v. 2, p. 1426. Abst. J. A. M. A., v. 74, p. 708.

**Shima.** Purulent Infection of Vitreous Body after Ocular Injury. Nippon Gank. Zasshi, June, 1919. Abst. Rev. Gen. d'Ophth., v. 34, p. 42.

**Vogt, A.** Examination of Hyaloid Canal with Nernst Lamp. Graefe's Arch. f. Ophth., v. 100, Ht. 3-4. Abst. Berl. klin. Woch., v. 56, p. 1100.

#### RETINA.

**Abelsdorff, G.** Circulation of Blood in Eye. Arch. f. d. ges. Physiol., v. 168, p. 599.

**Amman, E.** Detachment of Retina. Klin. M. f. Augenh., v. 63, July-Aug. Abst. Berl. klin. Woch., v. 56, p. 1028. Wien. klin. Woch., v. 49, p. 2402.

**Augstein.** Papilloretinitis with Ring Scotoma. Klin. M. f. Augenh., v. 63, July-Aug. Abst. Wien. klin. Woch., v. 49, p. 2401. Berl. klin. Woch., v. 56, p. 1028.

**Bard, L.** Retinal Rods and Pigment and Perception of Colors. Jour. de Physiol. et de Path., v. 18, p. 276.

**Binnefeld, M.** Difference of Circulation in Eyes in Dark and Light. Arch. f. d. Psychol., v. 37, p. 129.

**Baumann, C.** Physiology of Seeing. Arch. f. d. ges. Physiol., v. 168, p. 434.

**Clarke, F.** Amaurotic Idiocy. Nebraska State Med. Jour., v. 5, p. 17.

**Collins, E. T.** Abiotrophy of Retinal Neuroepithelium or Retinitis Pigmentosa. Tr. Ophth. Soc. United King., v. 39, pp. 165-195.

**Cridland, B.** Unusual Condition of Fundus after Measles. Tr. Ophth. Soc. United Kingdom, v. 39, p. 368.

**Pernicious Anemia.** Tr. Ophth. Soc. United Kingdom, v. 39, pp. 369-370.

**Dietz, A.** Colored After Images. Nederl. Tijdschr. v. Geneesk., May-June, 1919.

**Doesschate, G. ten.** Retina of the Whale. Anat. Anz., v. 51, p. 200.

**Epstein, J.** Amaurotic Family Idiocy or Infantile Amaurotic Idiocy. Med. Rec., v. 97, p. 224.



- Finnoff, W. C.** Anomaly of Ocular Fundus. (1 col. pl.) *Amer. Jour. Opth.*, v. 3, p. 161.
- Frenkel, H.** Folds and Circles in Retina after Contusion of Posterior Segment. (1 ill., 1 pl.) *Rev. Gen. d'Opht.*, v. 34, pp. 1-6.
- Haas, H. K.** Disease of Retina and Optic Nerve from Arsenic. *Graefe's Arch. f. Opth.*, v. 99, Ht. 1. *Abst. Wien. med. Woch.*, v. 49, p. 2402.
- Henderson, E. E.** Rare Bilateral Chorioretinitis in Child. (1 col. pl.) *Tr. Opth. Soc. United Kingdom*, v. 39, p. 163.
- Hoeve, van der, J.** Eye Lesions Produced by Light Rich in Ultraviolet Rays, Senile Cataract and Degeneration of Retina. *Amer. Jour. Opth.*, v. 3, p. 178.
- Landolt, E.** Influence of Convex Glasses on Adaptation of Eye. (1 ill.) *Arch. d'Opht.*, v. 36, pp. 65-71.
- Matthews, R. H., and Crawley, F.** Retinitis Proliferans. *Tr. Opth. Soc. United Kingdom*, v. 39, p. 373.
- Neubner, H.** Etiology of Pseudonephritic Neuroretinitis. *Klin. M. f. Augenh.*, v. 63, June. *Abst. Wien. med. Woch.*, v. 49, p. 2401.
- Ochoterena, I.** Retina of the Tapayaxin. (7 ill.) *Mem. Soc. Cient., Antonio Alzate*, v. 28, pp. 169-169.
- Roberts, B. H. St. C.** Detached Retina after Cataract Extraction. *Tr. Opth. Soc. United Kingdom*, v. 39, p. 371.
- Zade.** Peripheral Ring Scotoma. *Graefe's Arch. f. Opth.*, v. 100, Ht. 1-2. *Abst. Berl. klin. Woch.*, v. 56, p. 1028.
- TOXIC AMBLYOPIAS.**
- Bab, W.** Damage to Eye from Methyl Alcohol Poisoning. *Berl. klin. Woch.*, v. 56, p. 995. *Abst. Jour. Amer. Med. Assn.*, v. 74, p. 637.
- Bleich.** Optochin Amblyopia. *Berl. klin. Woch.*, 1918, No. 19.
- Evans, J. J.** Quinin Amaurosis and Alcoholism. *Tr. Opth. Soc. United Kingdom*, v. 39, pp. 366-368.
- Fenton, R. A.** Dionin in Wood Alcohol Blindness. *Northwest Medicine*, v. 19, p. 22.
- Smith, H. E.** Quinin Amaurosis. *Tr. Opth. Soc. United Kingdom*, v. 39, pp. 310-316.
- OPTIC NERVE.**
- Arnold.** Optic Neuritis and Spotted Fever. *Wien. klin. Woch.*, 1919, No. 36.
- Seidel, E.** Nerve Fibers and Optic Nerve Stem in Retina of Man. *Graefe's Arch. f. Opth.*, v. 100, Ht. 1-2. *Abst. Berlin klin. Woch.*, v. 56, p. 1028.
- Werner, L.** Loss of Vision after Head Injury. *Trans. Opth. Society of the United Kingdom*, v. 39, p. 376.
- VISUAL TRACTS AND CENTERS.**
- Best, F.** Hemianopsia and Mind Blindness due to Brain Injury. *Graefe's Arch. f. Opth.*, v. 93, p. 49. *Jour. Nervous and Mental Dis.*, v. 51, p. 71.
- Theory of Hemianopsia.** *Graefe's Arch. f. Opth.*, v. 100, Ht. 1-2. *Abst. Berl. Klin. Woch.*, v. 56, p. 1028.
- Ferro, P. B.** Transient Unilateral Amaurosis. *Semana Med.*, v. 26, p. 611. *Abst., Jour. Amer. Med. Assn.*, v. 74, p. 837.
- Fuchs, A., and Pötzl, O.** Shot Wounds and the Center of Vision. *Jahresb. f. Psychiat. u. Neurol.*, v. 38, p. 115.
- Hird, R. B.** Disability of Homonymous Hemianopsia. *Trans. Opth. Soc. of the United Kingdom*, v. 39, pp. 353-358.
- Igersheimer, J.** Improvement of Visual Field with Hemianopsia. *Graefe's Arch. f. Opth.*, v. 100, Ht. 3-4. *Abst., Berl. Klin. Woch.*, v. 56, p. 1100.
- Mayou, M. S.** Pituitary Tumor. *Trans. Opth. Soc. United Kingdom*, v. 39, pp. 258-261.
- Tuto, R.** Hemianopsia after Grippe. (6 ill.) *Arch. de Oft. Hisp.-Amer.*, v. 19, pp. 662-670.
- COLOR VISION.**
- Allen, H. S.** Photoelectric Theory of Color Vision. *Nature*, v. 104, p. 174.
- Cowdrick, M., and Winfield, M.** Adjustment of Hering Color Blindness Apparatus. *Amer. Jour. Psychol.*, v. 30, p. 418.
- Hayes, S. P.** Color Defects in Vision. *Psychol. Bull.*, v. 16, p. 138.
- Joly, J.** Photoelectric Theory of Color Vision. *Nature*, v. 104, p. 74.
- Lodge, O.** Photoelectric Theory of Color Vision. *Nature*, v. 104, p. 92.
- EYEBALL.**
- Cabannes, C., and Kerbrat, Y.** Panophthalmitis with Grippe. *Gaz. hebdom. d. Sc. Med. de Bordeaux*, v. 40, p. 218.
- Fischel, A.** Reason for Formation of Eyes. *Arch. f. Entwickl. d. Organ.*, v. 44, p. 647.
- Krauss, F.** Improved Method for Total Enucleation of Eyeball. (4 ill.) *Amer. Jour. Opth.*, v. 3, p. 166.
- Rabl, G.** Symmetry of Eyes of Vertebrate Animals. *Arch. f. Mikr. Anat. Bonn.*, v. 90, 1, p. 261.
- THE LACRIMAL APPARATUS.**
- Busco, J.** Absence of Tears in Newborn. *Prenza med. Argent.*, v. 6, p. 40.
- Nager.** Endonasal Tear Sac Operation. *Correspbl. f. Schweiz. Aerzte.*, v. 49, p. 941.
- Rochat, G. F.** Testing Permeability of Lacrimal Canal. *Nederl. Tijdschr. v. Geneesk.*, v. 2, p. 1429. *Abst., Jour. Amer. Med. Assn.*, v. 74, p. 708.
- St. Martin, R.** Dacryocystectomy. *Médecine, Paris*, p. 205.
- Vacher, L., and Denis, M.** Cauterization for Dacryocystitis. *Médecine, Paris*, v. 1, p. 207. *Abst., Jour. Amer. Med. Assn.*, v. 74, p. 705.
- Van Lint.** Trephining and Placing of India Rubber Drain in Chronic Dacryocystitis. *Arch. d'Opht.*, v. 36, pp. 42-47.

## LIDS.

- Barrada, H.** Combined Excision Operation in Trichiasis. *Trans. Ophth. Soc. United Kingdom*, v. 39, pp. 401-406.
- Giri, D. V.** Ptosis Malposition and Limitation of Movement of Eye, Improved by Operation. (2 ill.) *Trans. Ophth. Soc. United Kingdom*, v. 39, p. 129.
- Lawson, A., and Russ, S.** Method of Employing Radium in Superficial Lesions of Eyelids. (2 ill.) *Trans. Ophth. Soc. United Kingdom*, v. 39, pp. 102-109.
- Lederer.** Xeroderma Pigmentosum and the Eye. *Graefe's Arch. f. Ophth.*, v. 100, Ht. 1-2. *Abst., Berl. klin. Woch.*, v. 56, p. 1027.
- Müller, M.** Xeroderma Pigmentosum and Eye Diseases. *Klin. M. f. Augenh.*, v. 63, July-August. *Abst., Berl. klin. Wochenschr.*, v. 56, p. 1027.
- Ochsenius, K.** Treatment of Simple Blepharitis. *Jahrb. f. Kinderheilk.*, v. 87, 1918. *Abst., Rev. Gen. d'Ophth.*, v. 34, p. 51.
- Sadek, M. T.** Cicatricial Ectropion of Lower Lid, Treated by Blepharoplasty. (2 ill.) *Trans. Ophth. Soc. United Kingdom*, v. 39, pp. 391-399.
- Werner, L.** Truc's Operation for Ectropion. *Trans. Ophth. Soc. United Kingdom*, v. 39, p. 374.
- ORBIT.**
- Cavara, V.** Pathogenesis of Orbital Cyst. *Riforma Med.*, v. 35, p. 978. *Abst., Jour. Amer. Med. Assn.*, v. 74, p. 834.
- Cruise, R. R.** Contracted Socket after Treatment by Operation. *Trans. Ophth. Soc. United Kingdom*, v. 39, p. 128.
- Gomes, P.** Pulsating Exophthalmos. *Ann. Paulistas de Med. e Cirurg.*, v. 10, p. 241. *Abst., Jour. Amer. Med. Assn.*, v. 74, p. 769.
- Houwer, M.** Thrombosis of Orbit. *Klin. M. f. Augenh.*, v. 63, July-August. *Abst., Berl. klin. Wochenschr.*, v. 56, p. 1028.
- Jeandelize, P.** Dilatation of Orbit. *Médecine, Paris*, v. 1, p. 213. *Abst., Jour. Amer. Med. Assn.*, v. 74, p. 705.
- Lacroix, A.** Varicocele of Orbit. (4 ill., Bibl.) *Arch. d'Ophth.*, v. 36, pp. 106-113.
- Lagrange, F.** Orbital Anaplerosis. *Arch. d'Ophth.*, March-April, 1919. *Abst., Brit. Med. Jour.*, v. 4, p. 130.
- Lapersonne, F. de, and Sendral.** Result of Bilateral Ligation of Carotid in Traumatic Exophthalmos. (6 ill.) *Arch. d'Ophth.*, v. 36, pp. 8-22.
- Lynch, R. C.** Displacement of Eye in Association with Chronic Frontal Sinuitis. (5 cases.) *Southern Med. Jour.*, v. 13, p. 207.
- Morax, V.** Plastic Operations on Orbital Region Including Restoration of Eyebrows, Lids, and Orbital Cavity. (Bowman Lecture) (4 ill., 2 pl.) *Trans. Ophth. Soc. United Kingdom*, v. 39, pp. 5-27.

## PARASITES.

- Repeated Titles. *Motais.* (v. 1, p. 880.) *Brit. Jour. Ophth.*, v. 4, p. 133.

## TUMORS.

- Campos, E.** Ocular Dermoids. *Brazil Med.*, v. 33, p. 275.
- Cunningham, J. F.** Endothelioma of Lacrimal Gland. *Trans. Ophth. Soc. United Kingdom*, v. 39, p. 143.
- Doesschate, G. ten.** Metastatic Sarcoma of the Eye. *Nederl. Tijdschr. v. Geneesk.*, v. 2, p. 1432. *Abst., Jour. Amer. Med. Assn.*, v. 74, p. 708.
- Feder, H.** Sarcoma of Ciliary Body. *Munch Thesis*, 1918.
- Fischer, B.** Ocular Gliomas (Neuroblastoma). *Cent. f. allg. Path. u. Anat.*, v. 29, p. 545.
- Jacovides.** Papilloma of Limbus in Kaposi's Disease. *Trans. Ophth. Soc. United Kingdom*, v. 39, pp. 399-401.
- Lindahl, C.** Illumination of Tumor in Choroid. *Upsala Läk. Föreländ.*, v. 25, p. 1.
- Mayou, M. S.** Endotheliomata of Periosteum of Orbit. (2 ill., 1 pl.) *Trans. Ophth. Soc. United Kingdom*, v. 39, p. 135.
- Paton, L.** Cyst of Krause's Gland. *Trans. Ophth. Soc. United Kingdom*, v. 39, p. 129.
- Paton, L., and Collins, E. T.** Angioma of Choroid. (2 pl., Bibl.) *Trans. Ophth. Soc. United Kingdom*, v. 39, pp. 157-162.
- Raueiser, A.** Extra and Intraorbital Dermoid. *Klin. M. f. Augenh.*, v. 63, July-August.
- Satanowsky, P.** Sarcoma of Eyelid. *Semana Med.*, v. 26, p. 600. *Abst., Jour. Amer. Med. Assn.*, v. 74, p. 836.
- Velard, H. E.** Six Cases of Retinal Glioma. *Rev. Filipina de Med. y. Farm.*, v. 10, p. 373.
- Würdemann, H. V.** Lymphosarcoma of Orbit. (1 ill.) *Amer. Jour. Ophth.*, v. 3, p. 210.
- INJURIES.**
- Aubaret and Ourgaud.** Retrobulbar Commotion, Amblyopia and Strabismus. *Marseille Méd.*, v. 56, p. 822.
- Bab, W.** Rupture of Choroid. *Berlin Thesis*, 1917.
- Clarke, E.** Injury in Region of Eye by Fork. *Trans. Ophth. Soc. United Kingdom*, v. 39, p. 208.
- Fraudet, H.** Localization of Foreign Bodies in Ocular Globe. *Jour. de Radiol d'Electrol.*, v. 3, p. 310.
- Gazepis, Z.** The Visual Field in Injury to Back of Eye. (1 ill.) *Arch. d'Ophth.*, v. 36, pp. 47-50.
- Lister, W. T., and Hine, M. L.** Evulsion of Optic Nerve. (4 pl., Bibl., Dis.) *Trans. Ophth. Soc. United Kingdom*, v. 39, pp. 196-207.
- Fuchs, E.** Indirect Scleral Rupture. *Klin. M. f. Augenh.*, v. 63, July-Aug. *Abst. Wien. med. Woch.*, v. 49, p. 2402; *Berl. klin. Woch.*, v. 56, p. 1028.
- Hansell, H. F.** Burn of Eyes by Salt of Copper. *Amer. Jour. Ophth.*, v. 3, p. 208.
- Kraupa, E.** Contusion of Eye. *Wien. klin. Woch.*, v. 31, p. 1218.

- McKellar, J. H.** Keratoconjunctivitis from Dichlorethylsulphid. (1 ill.) Amer. Jour. Ophth., v. 3, p. 209.
- Motolese, F.** Ocular Siderosis. Morgagni, Milano, v. 61, 1, p. 215.
- Pereira, G.** Total Luxation of the Ocular Globe. La Presse Méd., Jan. 17, 1920, p. 52.
- Perol, B., and Bazin, G.** Localization of Foreign Bodies by Belat-Fraudet Method. Jour. de Radiol. et d'Electrol., v. 3, p. 303.
- Rumbar, W.** Intraocular Foreign Bodies in War. Klin. M. f. Augenh., v. 63, July-August. Abst., Berl. klin. Woch., v. 56, p. 1029.
- Smith, V. C.** Complications following Foreign Bodies in Eye. Internat. Jour. Surgery, v. 33, pp. 59-61.
- Story, J. B.** Wound of Cornea with Anterior Synechia. Trans. Ophth. Soc. United Kingdom, v. 39, p. 377.
- Tobias, Nickol** Splinter in Retina. Klin. M. f. Augenh., v. 63, July-Aug. Abst., Berl. klin. Woch., v. 56, p. 1029.
- Vinsonneau.** Foreign Bodies in the Eye. Médecine, Paris, v. 1, p. 208. Abst., Jour. Amer. Med. Assn., v. 74, p. 705.
- Repeated Titles. **Morax.** (v. 1, p. 752.) Brit. Jour. Ophth., v. 4, p. 137.
- PATHOLOGY.**
- Vogt, A.** Hereditary Eye Disease. Münch. med. Woch., v. 66, pp. 1-5.
- Guglianetti, G.** Action of Bacterial Toxins on the Healing of Ocular Wounds. Arch. di Ottal., v. 26, pp. 181-234.
- GENERAL DISEASES.**
- Berens, C., and Uren, T. C.** Effect of Nose and Throat Infection upon Eyes of Aviators. Amer. Jour. Ophth., v. 3, p. 170.
- Binet, L.** Ocular Compression (Cardiac reflex). Presse Méd., v. 27, p. 462.
- Bond, E. D.** Epidemic Encephalitis and Katonic Symptoms. Amer. Jour. Insanity, v. 76, pp. 261-264.
- Boyd, W.** Encephalitis Lethargica in Winnipeg, Canada. (Bibl.) Canadian Med. Assn., Jour., v. 10, pp. 117-140.
- Colombo, G. L.** Study of Ocular Syphilis in Man. Biochem. e Terap. Sper., v. 6, p. 105.
- Hammes, E. M.** Lethargic Encephalitis. (3 ill., Bibl.) Minnesota Med., v. 3, pp. 118-124.
- Hensen, H.** Salvarsan in Luetic Eye Disease. Klin. M. f. Augenh., v. 63, July-August. Abst., Berl. klin. Woch., v. 56, p. 1028. Wien. med. Woch., v. 48, p. 2362.
- Kiep, W. H.** Ocular Complications of Dysentery. Trans. Ophth. Soc. United Kingdom, v. 39, pp. 298-310.
- Laval, F., and Girou, J.** Oculocardiac Reflex. Gaz. des Hop., v. 92, p. 668. Abst., Arch. d'Opht., v. 36, p. 126.
- Lloyd, J. H.** Ocular Conditions in Friedreich's Ataxia. Arch. of Neurology and Psychiat., v. 3, p. 333.
- Moure, P.** Ocular Lesions in Sporotrichosis. Rev. de Chirurgie, 1919, p. 404.
- Netter.** The Eye and Encephalitis Lethargica. La Presse Méd., Jan. 10, 1920, p. 28.
- Potts, J. B.** Nasal Infection and Ocular Lesions. Amer. Jour. Ophth., v. 3, p. 195.
- Sinclair, W.** Ocular Complications in Cerebrospinal Fever. Trans. Ophth. Soc. United Kingdom, v. 39, pp. 233-239.
- Spring, J. F.** Tuberculin. Med. Jour. Australia, Feb. 7, 1920, pp. 121-123.
- Steinert, E.** Congenital Ocular Syphilis. Wien. med. Woch., 1919, No. 43, p. 2118.
- Tubby, A. H.** Connection between Skeletal Asymmetry and Defects of Eye. Oxford Ophth. Congress. Trans. Ophth. Soc. United Kingdom, v. 39, pp. 335-341.
- Webster, J. H. D.** Ocular Symptoms in Early Acromegaly. Arch. of Radiol. and Electroth., London, v. 24, p. 261. Abst., Jour. Amer. Med. Assn., v. 74, p. 765.
- Zimmermann, W.** Ocular Complications after Influenza. Klin. M. f. Augenh., July-August. Abst., Wien. med. Woch., v. 48, p. 2362.
- Ocular Complications in Influenza. Klin. M. f. Augenh., v. 63, July-August. Abst., Berl. klin. Woch., v. 56, p. 1029.
- HYGIENE.**
- Butler, H.** Eyesight and Education. Trans. Ophth. Soc. United Kingdom, v. 39, pp. 90-93.
- Clarke, E.** Myopia and Education. Trans. Ophth. Soc. United Kingdom, v. 39, p. 93.
- Harman, N. B.** Eyesight and Education. Trans. Ophth. Soc. United Kingdom, v. 39, pp. 78-90.
- Hay, P.** Eyesight and Education, Proper Illumination. Trans. Ophth. Soc. United Kingdom, v. 39, p. 94.
- Hoeve, van der, J.** Eye Lesions Produced by Light Rich in Ultraviolet Rays. Senile Cataract and Denegeration of Retina. Amer. Jour. Ophth., v. 3, p. 178.
- Hogue, G. I.** Conservation of Vision. Wisconsin Med. Jour., v. 18, pp. 361-364.
- Parsons, J. H.** Preventive Ophthalmology. Oxford Ophth. Cong., 1919. Trans. Ophth. Soc. United Kingdom, v. 39, pp. 269-298.
- Stack, E. H.** Eyesight and Education. Trans. Ophth. Soc. United Kingdom, v. 39, p. 97.
- Sym, W. G.** Eyesight and Education. Trans. Ophth. Soc. United Kingdom, v. 39, pp. 68-78.
- Thomas, D. O.** Inadequateness of Sight for Modern Demands. Jour.-Lancet, v. 40, p. 126.
- Whitehead, A. L.** Eyesight and Education. Ophth. Soc. United Kingdom, v. 39, pp. 39-95.
- OPHTHALMIC SOCIOLOGY.**
- Blind Masseurs.** Lancet, Feb. 21st, 1920, p. 456.
- Bowdler, A. P.** Defects of Visual Acuity Among Aviation Candidates. Brit. Jour. Ophth., v. 4, pp. 97-102.

- Brailey, A. R.** Visual Requirements of Aviators. *Tr. Ophth. Soc. United Kingdom*, v. 39, pp. 36-44.
- Broad, W. H.** Blind Masseurs. *Lancet*, March 6, 1920, p. 568.
- Clements, E. C.** Visual Requirements of Aviators. *Tr. Ophth. Soc. United Kingdom*, v. 39, pp. 44-49.
- Compensation for Eye Injuries. *Boston Med. and Surg. Jour.*, v. 182, p. 206.
- Cruise, R. R.** Vision of Aviators. *Tr. Ophth. Soc. United Kingdom*, v. 39, p. 54.
- Drummond, W. B.** Binet Scale for Blind. *Edinb. Med. Jour.*, v. 24, p. 91.
- Eaton.** Vision of Aviators. *Tr. Ophth. Soc. United Kingdom*, v. 39, p. 53.
- Erb, A.** Ocular Examination of Railway Employees. *Schweiz. med. Woch.*, Feb., 1920, p. 169.
- Flack.** Vision of Aviators. *Tr. Ophth. Soc. United Kingdom*, v. 39, p. 55.
- Greene, A.** Visual Requirements of Aviators. *Tr. Ophth. Soc. United Kingdom*, v. 39, p. 51.
- Hanna, H.** Analysis of 237 Cases of Eye Disease in Men of Ulster Division. *Tr. Ophth. Soc. United Kingdom*, v. 39, p. 386.
- Impairment of Vision; Expert Examinations. *Med. Rec.*, v. 97, p. 192.
- Parsons, J. H.** Visual Requirements of Aviators. *Tr. Ophth. Soc. United Kingdom*, v. 39, p. 51.
- Spearman, V.** Visual Requirements of Aviators. (2 ill.) *Tr. Ophth. Soc.*, v. 39, pp. 28-36.
- State Hospital and Asylum for Blind. *Med. Jour. Australia*, Jan. 24, 1920, p. 92.

#### EDUCATION, HISTORY AND BIOGRAPHY.

- Cantonnet, A.** French Ophthalmology. *Médecine, Paris*, v. 1, p. 195. *Abst. Jour. A. M. A.*, v. 74, p. 705.
- Duverger.** Lessons from Ophthalmic Clinic at Strasbourg, 1919. *Arch. d'Opht.*, v. 36, pp. 1-8.
- Evans, J. J.** Ophthalmology of the Future. *Tr. Ophth. Soc. United Kingdom*, v. 39, pp. 343-352.
- Meyerhof, M.** Ocular Diseases in Egyptian Sultans, 1513. *Arch. f. Ges. der Med.*, Bd. 11, p. 286.
- Report of 1917 and 1918 Director of Hospitals of Cairo. *Govt. Press*, 1919. *Lancet*, Feb. 21, 1920, p. 450.
- The Unfit in Ophthalmology. *New York Med. Jour.*, v. 111, p. 424.
- Repeated Titles. **Van Duyse.** (v. 3, p. 160.) *Jour. Amer. Med. Assn.*, v. 74, p. 767.